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Transportation Energy Contingency Planning:

Emergency Fuel Storage

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Prepared by
Municipality of Metropolitan Seattle

Prepared for
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Urban Mass Transportation Administration
Washington, D.C. 20590

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December 1982

FOREWORD

The decontrol of petroleum early in 1981 introduced a number of new factors into planning by transit operators. Removal of price controls and supply allocation rules meant that operators would have to compete in the market place for fuel supplies with other end users and that similar market mechanisms would be likely to influence both current and potential transit users. In order to prevent changes in these market-driven factors from negatively effecting transit operators, the Urban Mass Transportation Administration (UMTA) has been and will continue to encourage energy contingency planning.

In order to assist transit operators in carrying out this important activity, UMTA is developing a number of materials providing technical assistance. Reports are being produced in a series entitled Transportation Energy Contingency Planning. Previous reports have included the following:

- A Guide for Transit Operators, (DOT-I-82-12)
- Transit Fuel Supplies Under Decontrol, (DOT-I-82-20);
- Taxi and School Bus Use in Dallas-Forth Worth, (DOT-I-82-38);
- Quantifying the Need for Transit Action, (DOT-I-83-02)
- Financing Emergency Transit Services with Temporary Fare Surcharges, (DOT-I-83-09).

This report, Emergency Fuel Storage, is designed to provide information on means of assessing the feasibility of and planning for improved fuel storage as a contingency strategy. The report also highlights a number of benefits of enhanced storage which can be achieved in normal day-to-day transit operations. We believe that many operators will find expanded fuel storage facilities to be worthwhile both as a contingency strategy and to enhance operational flexibility in times of normal fuel supply.

Additional copies of this report, or others from the series, are available from our offices upon receipt of a self-addressed label, while supplies last. In addition, reports are available from the National Technical Information Service, Springfield, Virginia 22161. Please refer to UMTA-WA-09-0034-83-4 when requesting this report.

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CHAPTER 1

INTRODUCTION

Background

Diesel and gasoline fuels represent the "lifeblood" of modern bus transit systems. Reliable access to adequate fuel supplies allows for the provision of safe, convenient and dependable public transportation services. Without enough fuel--due to local delivery obstructions, regional supply slowdowns or a sudden unforeseen supply cutoff--most systems would be hard pressed to maintain or expand operations. Some properties, particularly over the short term, might even have to reduce regularly scheduled service for lack of fuel. Should this occur, valuable farebox revenue would inevitably be lost, ridership levels would fall (perhaps permanently), and customers would suffer the direct adverse consequences of reduced transit mobility.

America's transit systems have weathered two serious fuel supply emergencies over the last decade: the 1973-74 and 1979 energy crises. To varying degrees, both these crises caused transit managers to worry about running short of fuel. Few, if any, properties were adequately prepared in advance for coping with supply emergencies all on their own. Generally, the rush to secure alternative fuel supplies was rather haphazard and disorganized. Those systems that survived operationally did so with the assistance of special federal and state "set-aside" fuel allocation programs. Although there were steep increases in the price paid for fuel, these government programs helped prevent widespread service cutbacks and also facilitated service expansions to meet increased ridership demands. In addition, managers were given sufficient time to readjust and supplement their existing gasoline and diesel fuel supply arrangements.

There have been no significant energy crises since 1979 that resulted in transit fuel emergencies. Major strides have been made in the development of contingency planning strategies to guide transit operations and fuel supply acquisition activities should a crisis shortfall arise in the future. Yet great uncertainty persists as to how well these plans will work in providing suitable reserve fuel supplies over the course of an actual emergency.

Government-sponsored fuel allocation programs are no longer reliable. On March 31, 1981, the U.S. Department of Energy terminated its Special Rule No. 9. This mechanism had ensured surface mass transportation systems 100 percent of their diesel fuel needs during a supply shortage. In addition, state "set-aside" fuel allocation programs capable of diverting emergency diesel and gasoline supplies to transit vary substantially from one region to another and are largely untested. Thus, many transit operators have no emergency fuel supply security other than those reserves stockpile arrangements they manage themselves.

Regardless of the specific circumstances underlying a fuel emergency--energy crisis, natural disaster, or man-made catastrophe--managers need to know they can provide suitable transit services quickly, confidently and effectively. This capacity, in turn, hinges on the system's having unobstructed access to operational fuel supplies at all times. A specially-designated transit fuel set-aside, or some combination of permanent reserve storage and assured emergency supply arrangements will go far in providing bus properties with the emergency response capability they so urgently require.

Purpose and Scope

This manual has three primary objectives related to helping managers plan for emergency transit fuel supplies:

- To inventory existing fuel reserves and assured or allocated supply arrangements with respect to volume, security of access and reliability.
- To calculate how much additional transit fuel supply capacity is needed.
- To analyze alternative strategies for upgrading fuel reserve and emergency supply arrangements.

The bulk of the guidebook addresses practical questions which should be asked about a transit system's ability to meet fuel demands during short-term emergency periods. These include:

- What range of fuel reserve supplies are exclusively controlled by the transit property? Other sources of emergency fuels?
- What minimum size transit fuel reserve should be maintained strictly for use during emergencies?
- What critical factors determine the adequacy of fuel reserve storage and other emergency supply mechanisms?
- What different types of emergency fuel supply alternatives are available? Independent assured supply contracts? Tank storage leasing, purchase, or new construction?
- What advantages and disadvantage are associated with each of these alternatives? Financial? Operational? Community and Environmental? Regulatory?
- How can a transit property determine its single best fuel reserve option, or combination of options?
- What information resources can be consulted at any stage when examining emergency fuel needs, storage requirements and storage options?

Recommended Planning Procedure

Planning for transit fuel reserves involves working through a sequence of three stages:

Stage I - Reserve Capacity and Needs Assessment.
Stage II - Storage Alternatives Development.
Stage III - Storage Alternatives Evaluation.

At each stage a number of specific planning steps and related sub-tasks are highlighted to guide decision makers (Appendix A lists these steps and task elements). In theory, this process can be initiated at any stage. Ideally, however, the guidebook is structured to encourage a deliberate well-sequenced planning effort that moves through all recommended stages, steps and sub-tasks from inventory to implementation.

Organization and Use of the Guidebook

In addition to this introduction, the guidebook is divided into three main chapters plus a series of appendices. Chapter 2, for example, describes a methodology to help transit managers determine the extent of their existing fuel reserve capacity. It also suggests a minimally acceptable volume of fuel reserve storage and demonstrates how individual properties can pinpoint storage needs. Transit systems grappling with the issue of emergency fuel reserves for the very first time will find this section useful and informative.

Chapter 3 is geared toward operators who have identified fuel reserve storage inadequacies and are firmly committed to upgrading their emergency supply arrangements. In particular, the section outlines preliminary planning criteria to assist the identification of viable storage alternatives. Also the leading reserve options are surveyed here. This chapter works to prepare managers to narrow down final reserve storage alternatives for detailed evaluation.

Chapter 4 presents a framework for evaluating two or three reasonable fuel reserve alternatives. Here, considerable emphasis is placed on the advantages and disadvantages of each option from a financial, operational, regulatory and environmental perspective. If operators still intend to continue planning at this point, the framework will aid them in conducting detailed feasibility analyses and in selecting a preferred reserve alternative that:

- Meets minimum fuel reserve capacity requirements by guaranteeing permanent access to emergency supplies.
- Offers the potential for cost savings in addition to fuel supply security.
- Has a good change of implementation within a time frame acceptable to the system.

Following a few final remarks in Chapter 5, the guidebook presents a series of technical and resource appendices of interest to properties participating in a fuel reserve planning exercise. These appendices include:

- A Summary Checklist of Key Transit Fuel Reserve Planning Steps.
- A Glossary of Fuel Reserve Planning Terms.
- Fuel Reserve Storage Inventory Worksheets.
- Sample Assured Fuel Supply Contract.
- A Checklist of Potential Development Permits and Authorizations.
- Sample Fuel Storage and License Agreement.
- The Seattle Metro Experience in Transit Fuel Reserve Planning.
- Emergency Fuel Supply Strategies for the Unprepared Transit Manager.

CHAPTER 2

STAGE I. TAKING STOCK OF EMERGENCY TRANSIT FUEL RESERVES

Introduction

Transit systems are likely to initiate a fuel reserve inventory for several reasons: first, to provide an up-to-date profile of the volume and reliability of emergency gasoline and diesel supplies on hand or within reach. And, second, to evaluate the need for additional fuel reserve storage. In either case, the most important questions to be posed at the outset of the inventory are:

- How large an emergency fuel supply can be mobilized on short notice to meet operational transit demands?
- From what source(s) would these supplies probably originate?
- Are emergency fuel supplies adequate as they now stand?
- If additional fuel reserve storage is justified, what kinds of alternatives are available?

For most properties, a primary objective will be to complete this inventory quickly without any significant outlay of staff or budget. The initial task need not be assigned to a special energy management task force. Rather, one or two persons somewhat familiar with base operations, fuel purchasing and storage procedures and transit fuel use trends ought to be recruited. Once initiated the inventory should not require more than a few days work.

It is also advisable that a standardized data collection format be utilized. Transit managers will benefit greatly from an accurate and understandable system-wide profile of their fuel reserve arrangements (see Appendix C).

This chapter describes a three-step procedure designed to help operators take stock of their emergency fuel supply capabilities and identify storage deficiencies requiring correction. (Table 2-1) These steps are:

- Inventory the property's emergency fuel supply arrangements.
- Establish minimum fuel reserve storage requirements.
- Assess the nature and significance of reserve storage deficiencies.

STEP 1. INVENTORY THE PROPERTY'S CURRENT EMERGENCY FUEL SUPPLY ARRANGEMENTS.

Objective: To identify how much diesel and gasoline fuel is available either on hand or within reach for use in times of transit emergencies.

TABLE 2-1. EMERGENCY FUEL SUPPLY INVENTORY STAGE CHECKLIST

- Step 1

  _____ Identify on and off-base fuel storage tanks.

  _____ Total volumes in storage.

  _____ Calculate excess reserve capacity.

  _____ Identify special emergency tanks.

  _____ Profile fuel delivery patterns.

  _____ Differentiate owned and leased tanks.

  _____ Review tank leasing contracts.

  _____ Identify independent assured fuel supply contracts.

- Step 2

  _____ Calculate monthly operational fuel demand.

  _____ Set a minimum emergency fuel supply requirement.

- Step 3

  _____ Assess fuel reserve storage deficits.

  _____ Examine reliability and security of access concerns.

  _____ Review fuel quality control management.

  _____ Develop an emergency fuel supply alternatives study.

Summary of Tasks:

- Determine the amount of fuel now stored on or off base in excess of day-to-day operating requirements.
- Calculate the extent of under-utilized tank storage capacity.
- Review fuel supplies assured under contracts with independents.

On and Off Base Fuel Storage Tanks

Virtually all transit systems fuel their bus fleets from supplies stored in underground tanks at operating bases. Depending on the volume of storage, and the rate at which fuels are normally consumed, these tanks may be refilled on a daily, weekly, or biweekly basis. Seldom, however, does one find a system with sufficient storage to support bus operations beyond two weeks without needing to have additional fuel supplies delivered. In addition, the fuel level at which tanks are maintained (100 percent, 50 percent, etc.) varies widely from property to property.

At the outset of the fuel reserve inventory, a brief survey of on-base storage capabilities will give the operator a good idea of:

- How large a fuel supply regularly exists on hand at each operations base.
- Fuel supply delivery patterns by volume and frequency over time.
- The presence of special set-aside fuel tanks for emergency situations.
- Excess fuel storage capacity.

In parallel with the review of on-base fuel storage practices, off-base fuel storage facilities must also be reviewed. This is because transit systems often own or lease fuel storage tanks located within their general operating area, but not directly at bus bases. When constructing a thorough profile of fuel storage facilities, both on and off-base tanks--whether leased or owned--warrant inclusion in the inventory. Besides calculating total volumes of fuel available (by base), estimates should also be made of how many days of bus operations can be supported by stored supplies.

The most appropriate sources of information in this regard are fuel purchasing officers and base maintenance and operations personnel.

Underutilized Fuel Storage Capacity

If all transit fuel storage tanks were consistently kept 100 percent full at all times, the initial survey effort outlined above would paint a fairly accurate picture of a system's available supply. Unfortunately, this procedure is the exception, not the rule. Most properties do not follow a full tank storage policy. A far more common practice is to keep tanks at least 40-60 percent full and to schedule fuel withdrawals and deliveries accordingly. Fuel tank capacities are often underutilized as a result. Knowing how much excess fuel storage capacity exists on a regular basis will give transit managers an indication of the potential for stockpiling additional emergency supplies. It will also alert systems to the volumes of operational fuel on hand as well as any reserve supplies already occupying excess storage capacity.

Exclusive Emergency Fuel Storage Tanks

Besides built-in reserve fuel supplies (i.e., supplies mixed with, but in excess of, day-to-day operational fuel needs), transit systems may occasionally maintain special fuel tanks for use in emergencies. These exclusive, set-aside storage facilities, whether owned or leased by the property, comprise a separate inventory category. The most important descriptive data required are their:

- Size and location.
- Owned or leased status.
- Management and utilization.

Independent Assured Fuel Supply Contracts

Another source of transit fuel supplies, designed primarily as an emergency backup system, are contingency supply contracts negotiated with independent firms. Unlike the leasing of tank storage, which also entails formal contractual arrangements, this mechanism guarantees deliveries of fuel to transit properties but only under specific circumstances.

Such commitments provide an extra margin of supply security in the event that a transit system's primary supplier defaults on prior delivery obligations. For a monthly fee, for example, a secondary supplier often will promise to make a fixed quantity of fuel available on short notice should a sharp delivery cutback occur. Compliance with contract terms is normally ensured by requiring an up-front performance bond from suppliers or by incorporating breach of contract penalty clauses.

At the inventory stage, therefore, managers should specify: the current status of contingency supply contracts; the precise volume of assured fuels; the exact conditions under which fuel will be delivered; and contract reliability based on experiences to date.

System-Wide Emergency Fuel Supply Profile

The final task in Step One is to profile the transit system's existing emergency fuel supply capacity. To start, identify each supply mechanism including standard on/off-base tanks; special reserve tanks; and supplies assured by private contracts. Then, with the assistance of an inventory form (see Appendix C), begin calculating the total volume of emergency supplies on hand or within reach for both diesel and gasoline.

STEP 2. ESTABLISH MINIMUM FUEL RESERVE STORAGE STANDARDS.

Objective: Establish minimum emergency fuel supply requirements.

Summary of Tasks:

- Determine exactly how much fuel should be maintained on hand in reserve storage or within reach for use during emergencies.
- Compare recommended supply levels with existing fuel reserve storage and assured supply arrangements.

Transit Fuel Reserve Storage Standards

Transit fuel reserve storage involves the maintenance of emergency diesel or gasoline supplies over and above the fuel consumed by day-to-day vehicle operations. As noted in the inventory exercise above, a property can establish these fuel stockpiles in a variety of tank storage modes, often supplementing them with other assured supply mechanisms:

- Utilize the excess capacity of regular on or off-base storage tanks.
- Designate special "emergency use only" storage facilities (on or off-base).
- Negotiate emergency assured fuel contracts with independent firms.

Each of these strategies is characterized by certain advantages and disadvantages (see Stage III of the manual for an analysis of these issues). Regardless of the approach chosen, however, transit managers must first set certain minimum fuel reserve storage standards that reflect both the operational dimensions of the system and their own sense of supply security.

No universally-accepted methodology exists for calculating how large a transit property's fuel reserve ought to be. Some systems regularly maintain only a few days of extra operating supplies; others carry a month's worth or more of reserves. In general, however, transit contingency planners recommend that fuel reserve storage volumes be at least equal to a 30-day operational supply. Thus, if a crisis shortfall or delivery problem were ever to arise, the month's fuel reserve would allow the continuation of normal service over the short term. It would also give managers valuable time to identify alternate sources of suppliers while the fuel market gradually readjusted itself. This reserve would not, of course, ensure the availability of supplies in the event of a severe, long-lasting fuel crisis of several months' duration.

The minimum fuel reserve storage level recommended for individual transit properties is a function of their total operational fuel demand, i.e., fuel consumption rates. This demand represents the average monthly volume of fuel used.

Ideally, the monthly operational demand figure should incorporate projected fuel use trends over a five- or ten-year period. In this way managers can allow for any expected growth in fuel usage and set a more accurate long-term fuel reserve storage minimum requirement. Both diesel and gasoline fuel reserve needs should be approached from a present and future perspective.

The average monthly rate of fuel consumption equals the 30-day minimum fuel reserve standard. By stockpiling this amount of fuel, properties can be reasonably confident that mild to moderate supply shortfalls will not force them to invoke dramatic bus service reductions. In a large system whose buses consume an average of 300,000 gallons of diesel fuel per month, for example, the minimum reserve standard would be a 300,000-gallon supply maintained exclusively for use during emergencies. For smaller systems reserve requirements will probably fall into the 30,000 to 100,000-gallon range.

Compare Existing and Recommended Minimum Fuel Reserve Capacities

The next task facing the manager involves a routine comparison of:

- The volume of transit fuel now contained in reserve storage.
- The volume of fuel reserve storage recommended as a minimum standard.

Where current fuel reserve storage levels exceed minimum storage standards, the transit system would appear to have an adequate back-up fuel supply upon which to fall in a fuel emergency. On the other hand, existing supply levels falling short of the recommended minimum point toward a reserve storage deficit.

In judging the adequacy of emergency fuel reserves, however, it is not enough just to analyze storage capabilities in quantitative terms. It is equally important to address certain qualitative issues as well, most notably:

- Security of access to supplies.
- Degree of quality control management exerted over reserves.

The next step discusses how fuel reserve storage deficiencies may be identified from this qualitative point of view.

STEP 3. ASSESS THE NATURE AND SIGNIFICANCE OF FUEL RESERVE STORAGE DEFICIENCIES.

Objective: Specify the adequacy of existing fuel reserve storage arrangements in qualitative terms.

Summary of Tasks:

- Profile the extent of fuel reserve storage volume deficits.
- Examine reliability and security-of-access concerns.
- Evaluate the status of fuel reserve quality control management mechanisms.
- Develop a fuel reserve alternatives study.

The Reserve Storage Profile

Let's assume for the moment that, in analyzing existing fuel reserve capabilities, a manager identifies a pronounced storage deficit: The system stockpiles less than a 30-day emergency fuel supply. Properties finding themselves in such a situation first need to know exactly how far they stand below the miniumum standard in strictly volume terms. Obviously, a key concern will be whether or not existing reserve storage arrangements need to be radically expanded or otherwise modified. Also, managers should begin to assess what financial resources are available for developing new storage mechanisms or upgrading the capacity of reserves currently in operation. Finally, a qualitative evaluation of on-line fuel reserve storage arrangements will greatly assist the decision-making process—regardless of the scale of emergency supply deficiencies.

There are a number of qualitative inquiries that can be posed to help judge the adequacy of transit fuel reserve storage practices:

- What percent of the available fuel reserves is stored in tanks owned and managed by the transit property? In leased tanks? On base? Off base?

- If stored off base in transit-owned or leased tanks, how can fuels be transported to operating bases in an emergency?

- How much direct participation does the property have in fuel management where tanks are leased from independent suppliers?

- How much of the system's emergency supply capacity consists of "on-paper" contractual assurances that fixed quantity fuel deliveries will be made during an emergency?

Reliability and Security of Access

To reiterate a point made earlier in this manual, transit managers must have confidence in their system's ability to draw from ample fuel reserves during a supply emergency. The uncertainty surrounding when a crisis may arise, how severe a shortfall may be, and how long transit fuel supplies might be threatened is considerable. The cautious operator, therefore, should choose fuel reserve storage mechanisms which offer the maximum degree of reliability and guaranteed security of access; enough assurance, in other words, to survive even the worst case shortage scenario. Other properties, in contrast, might prefer less elaborate fuel reserve arrangements involving a mixture of stockpiled supplies on hand and assured fuel delivery contracts. Each system must identify that strategy with which they are most comfortable.

First, conduct a qualitative evaluation of fuel reserve storage capabilities regardless of the estimated storage volume deficiency. Assume a set of mild, moderate and severe supply emergency conditions, and simulate the system's ability to cope by resorting to existing reserves. If any fuel reserve mechanisms have already been put to the test under actual crisis conditions, review the success or failure of their implementation. Otherwise, make a few reasonable projections as to their capacity to meet operational requirements during an emergency.

In particular, consider the following factors:

- Fuel transportation logistics.

- Protection against reserve pilferage or sabotage.

- 24-hour right of accessibility to storage tanks.

- Legal loopholes governing the conditions of emergency fuel supply contracts.

- The total economic cost of activating transit fuel reserves.

- Current regulatory restrictions affecting fuel reserve storage facilities.

This profile exercise will help transit managers establish just how comfortable their current margins of emergency supply security really are. It should also illuminate any hidden qualitative weaknesses in existing reserve arrangements which were not previously apparent.

Quality Control Management

Another critical reserve storage issue area deserving special attention is that of fuels quality control. The system-wide evaluation should, for example, assess how much direct management discretion the transit property exerts over reserves so as to ensure:

- Appropriate fuel specifications are maintained.
- Unauthorized storage "co-mingling" does not occur.
- Unauthorized fuel additives are not introduced.
- Proper schedules for fuel "rollover" are observed.
- Tank leakage is monitored, identified and promptly corrected.
- Biological or chemical contamination does not threaten fuel integrity.
- Volumes committed to storage are permanently maintained.
- Record keeping is accurate.

Clearly, levels of fuel reserve quality control are greatly enhanced wherever a transit property exerts direct management control. The more remote this control is, however, the more susceptible the system is to quality assurance problems lying outside a manager's jurisdictional authority, e.g., leased storage. No inventory procedure is complete until all fuel reserve arrangements are subjected to this type of analysis and evaluation.

Organize to Develop a Fuel Reserve Alternative Study

Once the review of emergency transit fuel supply arrangements is completed, few managers are likely to be entirely pleased with their inventory findings. For many systems identified weaknesses--whether quantitative or qualitative--will justify the search for new fuel reserve alternatives.

Individual properties must get organized quickly to initiate a transit fuel reserve alternatives study. The two most common choices in this regard are to:

- Contract the work out to a private consultant.
- Establish an in-house task force.

Utilizing a Consultant

By hiring a consultant the system will probably be forced to go out to competitive bid, an often time-consuming process. Consultant fees for research, spread out over a three- or four-month period, are apt to be somewhat expensive. Assuming a reliable firm is available to initiate the work, however, and that good project management oversight can be provided by the transit property, the cash outlay may well be worth the investment. In particular, managers can benefit from an independent analysis conducted by professionals familiar with site planning and alternative assessments.

Transit systems which are contemplating a consultant-generated study should be willing to search for an acceptable contractor, and be able to manage the project through to its completion. They should also be prepared to: criticize the professional judgments generated by their consultants; and to adopt those recommendations which best meet fuel reserve storage and planning objectives and siting criteria (see Stage II below).

Organize a Study Task Force

Rather than hiring a consultant, some systems might just as easily opt to carry out the basic alternative research and analysis by themselves. If this course is chosen then an agency task force should be formed. This task force should contain representatives from all or most of the following departments:

- Transit Operations.
- Transit Planning.
- Budget and Purchasing.
- Energy Management.
- Community and Intergovernmental Relations.
- Environmental Planning.
- Facilities and Right-of-Way.

The mandate and projected lifespan of the task force must be clarified at the outset of its work: three to six months is a reasonable performance period. The task force will benefit from being narrowly focused on fuel reserve storage issues and committed to making clear-cut recommendations to the agency executive as promptly as possible.

CHAPTER 3

STAGE II. DEVELOPING FUEL RESERVE STORAGE ALTERNATIVES

Introduction

Selecting the best possible strategy for enhancing emergency fuel supplies is a difficult and challenging job. To start, operators have a wide range of different options from which to choose. At the same time, most properties are constrained by limited financial resources. Two needs in particular are of paramount importance at this stage: the need to develop arrangements which provide guaranteed supply security and meet future emergency operating requirements; and the need to pursue alternatives that are both feasible and affordable.

The following section describes a series of recommended procedures to guide a transit manager through the process of alternatives development. (Table 3-1) These steps are:

- Develop a formal emergency fuel policy and set out preliminary planning criteria.
- Assess the opportunities for negotiating assured emergency supply contracts.
- Survey opportunities to lease, purchase, or construct additional fuel reserve storage.
- Prepare to initiate detailed feasibility analyses on two to three final reserve storage alternatives.

STEP 1. DEVELOP AN EMERGENCY FUEL RESERVE POLICY AND SET OUT PRELIMINARY PLANNING CRITERIA.

Objective: Commit the transit property to planning for fuel reserves at the policy level; and specify preferred reserve requirements in terms of:

- Storage volume.
- Location.
- Design.
- Security of access.
- Cost.
- Timing.

TABLE 3-1. EMERGENCY FUEL SUPPLY ALTERNATIVES DEVELOPMENT STAGE CHECKLIST

- Step 1

  _____ Develop an emergency fuel supply policy.

  _____ Set out preliminary storage volume, location, design, security, cost, and timing preferences and constraints.

- Step 2

  _____ Survey options to expand assured emergency fuel contracts.

- Step 3

  _____ Identify opportunities to lease storage.

  _____ Identify opportunities to purchase storage.

  _____ Survey market for new and used storage tanks.

  _____ Explore opportunity to construct a new off-base facility.

  _____ Explore opportunity to install tanks at bases.

  _____ Contact commercial/industrial real estate brokers.

  _____ Collect preliminary site data on financial, operational, regulatory and environmental obstacles and constraints.

- Step 4

  _____ Narrow down range of viable emergency fuel supply arrangements.

  _____ Initiate feasibility studies on alternatives.

Policy Declaration

The formation of a fuel reserve study task force, with or without outside consulting assistance, marks the transit property's entrance into the search for new storage options (See Stage I, Step 3, above). In order to instill some momentum into the group, however, it is advisable that an executive-level policy commitment be made to the project. Hopefully, financial resources, i.e., a study budget, will also accompany this commitment.

Armed with adequate policy-level support, the task force should be better equipped to:

- Define study goals and objectives.
- Increase agency-wide planning participation.
- Make well-informed recommendations.

Preliminary Planning Criteria

The first study task force function is to define fairly specific preferences about the basic type of fuel reserve desired. At least six issue areas ought to be addressed: storage volume, location, design, security of access, cost and timing. This information will set planning benchmarks to assist the initial screening process and thus should speed up the identification of reserve storage options.

Storage Volume

One of the more fundamental concerns is exactly how much additional fuel reserve storage is required. Another issue is the physical scale for new storage arrangements. The difference between the minimum reserve volume recommended for the property and the total of emergency fuel supplies already "on hand" or otherwise committed represents a critical determinant of scale. Depending on the differential, transit operators will be faced with severe, moderate or minor reserve supply deficits. Their initial planning strategies, therefore, must be tailored accordingly.

Location

Ample consideration should also be given to where a brand new storage facility might be established. Consider organizational priorities. Are sites at existing operating bases more preferable than sites off base? Is there a maximum distance from bases beyond which decentralized reserve facilities are not feasible? Has any transit agency consensus emerged in favor of one, centralized fuel reserve storage strategy? A mixture of sites? Finally, does the transit property's geography and surrounding land-use patterns lend themselves to a wide variety of potential reserve storage facility locations.

By asking such questions the task force can identify preferences early in the planning process without necessarily being site specific. The more clearly these basic criteria are defined, however, the easier it will be to separate serious reserve storage candidates from less desirable alternatives.

Design

Next to storage volume and location, another important element deserving attention is fuel reserve storage facility design. Assume that storage needs are recognized and that

locational preferences have been isolated. In terms of technical design, there may be little or no sense of what the reserve should look like. Is, for example, brand new tank equipment preferred or will used tanks do? Will it be possible to store fuels below ground or are projected reserve volumes such that above-ground tank facilities appear necessary? From an environmental safety and maintenance perspective, can any other fuel reserve design elements be highlighted by the task force at this time?

Security of Access

The only really dependable fuel reserve is the one into which a transit property can tap quickly on a moment's notice. Reserves owned and controlled by systems--particularly those located directly at or near maintenance bases--clearly offer the greatest degree of operational reliability and security. Other types of fuel guarantee arrangements, such as private assured supply contracts are somewhat less reliable.

Before screening a selection of alternatives give some thought to the least acceptable amount of supply security which must be ensured. If a transit system's management style is cautious, perhaps the most effecient stockpile arrangement will be an exclusively owned and operated transit reserve. Other systems, in contrast, may well be comfortable with less direct fuel reserve management responsibility.

There is no single best way to determine security of access. Every transit property will, based on their previous emergency shortfall experiences and contingency management outlooks, have certain unique preferences. During the initial planning stage, fuel reserve study groups should work toward defining what level(s) of security have been acceptable in the past; and whether more dependable fuel reserve access is justified (see Stage I, Step 3, for an additional discussion of security-of-access issues).

Cost

Any decision to alter a transit system's fuel reserve arrangement inevitably means that money must be spent to attain storage goals and objectives. Exactly how much money is dependent upon the nature and scale of proposed improvements or brand new facilities.

As managers scan the range of their reserve needs and wants, they should constantly be aware of possible financial constraints. Is the funding readily available to develop the "optimal" level of fuel reserve capacity? Can monies be diverted or raised by other means to increase the reserve storage planning budget? Are state and federal grants available which could finance a fuel reserve?

Where a property's fuel reserve deficit is great and the agency has mandated the need for guaranteed emergency supply security, a major capital expenditure may be necessary. On the other hand, less expensive options may be appropriate for many properties.

Timing

The degree of urgency accorded to the fuel reserve planning exercise is bound to vary substantially from property to property. Some operators will assign a high priority to upgrading emergency fuel supply arrangements as soon as possible. In other contexts, however, time may be a secondary concern and planning not so pressured.

First, establish the system's planning horizon for expanding its fuel reserve storage arrangements. Is it a short-term perspective? A long-term outlook? Once identified,

look for options which best fit within or can be adapted to that horizon. Most importantly, discourage poorly conceived or overambitious proposals which clash with identified needs, resources and work plans. Avoid overextending the system; at the same time encourage creative approaches to reserve storage planning.

STEP 2. ASSESS OPPORTUNITIES FOR NEGOTIATING ASSURED EMERGENCY FUEL SUPPLY CONTRACTS.

Objective: To determine the extent to which transit fuel reserves might be expanded through independent assured fuel supply contracts.

Summary of Tasks:

- Review options for securing assured emergency fuel contracts with independent suppliers.

Independent Assured Supply Contracts

Transit properties purchase their fuel on the open market in one of two ways: short-term contracts bid on a weekly or monthly basis; and long-term one- or two-year contracts bid or negotiated with independent petroleum suppliers. These short-term arrangements, popularly known as "spot market" transactions, give managers the advantages of easy market entry, especially during periods of depressed fuel prices; and through bulk purchase discounts stimulated by price competition. Long-term contracts, with or without a fixed price clause, guarantee the delivery of specified fuel supplies over some mutually agreed-upon performance period. Depending on their diesel and gasoline fuel needs, many transit systems rely on a combination of both these private market purchasing mechanisms.

Private wholesale and retail suppliers also frequently make special emergency fuel arrangements with transit properties. Such contracts are in essence a promise to initiate fuel deliveries (fixed volume) during an emergency, but only if a system's primary supplier defaults. Thus, for a nominal fee, the contingency supplier assures transit of at least some of its operating fuel requirements should a shortfall arise.

A good starting point for managers interested in assured fuel contracts is to contact their current fuel suppliers. In particular, find out what types of emergency supply commitments can be arranged and what fees would be incurred. If necessary, survey a number of other suppliers nearby and compare the operational and economic advantages and disadvantages of their respective offers (see Stage III, Step 1, below).

Make sure, finally, to evaluate existing fuel contract terms in the off chance that emergency supply delivery clauses are already in force.

STEP 3. SURVEY OPPORTUNITIES TO LEASE, PURCHASE, OR CONSTRUCT ADDITIONAL FUEL RESERVE STORAGE.

Objective: To find out what's for sale or lease in the way of existing tank storage facilities; and to survey the availability of possible new construction sites.

Summary of Tasks:

- Contact potential sellers of new and used tank equipment.
- Identify potential sellers or lessors of tank storage facilities already in place.
- Research the real estate market for commercial/industrial land parcels for sale.

New and Used Tank Equipment

Storage tank manufacturers, wholesalers, and retailers are widely distributed throughout the country. Transit systems interested in the purchase or lease of new reserve tanks (for placement on or off base) should conduct a brief telephone survey to find out what kinds of diesel and gasoline tank equipment are available. With the assistance of special trade journals or commercial yellow pages, this survey can be completed quickly. Managers need the following data:

- Tank design, capacities and projected life cycle.
- Maintenance schedules.
- Leasing arrangements, if any.
- Transportation/delivery fees.
- Purchase price.
- Referrals from current customers.

This information will provide an accurate picture of the total cost of "buying new." It also establishes a financial basis for comparing new and used equipment advantages and disadvantages.

The market for used storage tank equipment is characterized by an even greater diversity of potential sellers. Foremost among these suppliers are:

- Scrap metal dealers.
- Military installations.
- Public utilities.
- Oil companies.
- Other private industries.

Depending on the local and regional circumstances, a transit manager might well have an extensive used storage tank market from which to pick and choose. By telephoning the potential suppliers listed above a survey of available surplus tanks can be completed rapidly.

Throughout the survey acknowledge any cost constraints limiting the property's choice of tank equipment. Be practical about what portion of system-wide diesel and gasoline storage needs can be adequately met by this means. At times it may be appropriate to request a detailed history of used equipment from prospective sellers. The very least a manager should know is:

- The tank's age, its original life cycle estimate, and a professional engineering evaluation of its present condition.
- What materials were previously kept in tank and whether gas or diesel fuel storage is technically appropriate.
- What means exist for transporting tanks to their eventual storage site.
- Built-in safety and/or environmental protection features of the tank.
- Estimated cost of rennovation or retrofit.
- The potential for installing tanks above or below ground.

Operators may be surprised at the number and variety of available used storage tanks that can be adapted to meet their transit fuel reserve needs. At the same time, they should be very cautious when conducting surveys and engineering evaluations. For example, no property should ever purchase used tank equipment if its structural or operational reliability is in question.

Existing Tank Storage Facilities

Besides looking over the new or used tank equipment market, operators should seek out in-place tank facilities for sale or lease. Among the more likely locations for this type of storage are:

- Oil refineries and bulk distributing plants.
- Seaport and airports.
- Military installations.
- Public power utilities.
- Major industries.
- Civil defense agencies.
- State and local governments.
- Service stations.

To complete an assessment, develop a comprehensive list of all private and public storage sources within easy reach of the transit property. Be sure to distinguish between storage for lease and storage for sale. Exclude those sources that are clearly unrealistic based on past experience or informed judgments.

Then speak directly with operations personnel at each remaining site and collect the following information:

Leasing

- Do they have excess fuel storage capacity to lease?
- If yes, what kind, how large and where?
- What is their leasing policy?
- Can transit reserves be stored separately at the leased facility or would they be co-mingled?
- How are maintenance, security and access controlled?
- What are the projected lease costs (preferably a detailed monthly or yearly breakdown)?

Purchasing

- Are there any fuel storage facilities tanks for sale?
- What kind, how large and where located?
- Projected acquisition costs?
- Zoning designation?
- What is the age and condition of tanks?
- Previous use of tanks?

New Off-Base Construction

To evaluate off-base reserve storage construction options, managers must first identify vacant or unused land parcels that not only match preliminary planning criteria (see Stage II, Step 1) but also are currently for sale. In particular, the following site-specific data are required:

- Advertised selling price.
- Applicable zoning codes and permits in force.
- Above- and below-ground storage potential.
- Distance from operating bases.
- Fuel delivery transportation logistics.
- Estimated compatibility with community activity patterns.
- Natural environmental hazards and sensitive ecological habitat.

- Property taxes and utilities.

- Projected scale and cost of site preparation activities, e.g., sewer and water hookups; earthworks.

Probably the best sources of this basic information are local commercial/industrial real estate brokerage firms. These firms usually know the market inside and out and maintain multiple listings of available sites. Their services can be tapped quickly and at low cost.

Transit systems should be able to formulate a fairly accurate picture of what types of sites are available from secondary sources alone. Planning and engineering specialists, working under the direction of a fuel reserve task force can provide staff support to complete the initial evaluation. Profiles of alternatives should, however, also incorporate in-person visits to prospective sites and informal talks with relevant government departments and private citizens. These steps will assist the preliminary screening of construction alternatives and help managers decide whether or not building a brand new storage facility is feasible.

New On-Base Construction

One other variation on new construction options is for managers to consider expanding enlarged tank equipment at one or more existing operating bases. This approach toward fuel reserve storage is not viable, however, unless:

- Sufficient construction space, either above or below ground, already exists.

- Managers are willing and able to endure temporary construction disruptions.

- Suitable tanks can be purchased.

- The bases are expected to remain functional for some time to come.

The older the transit property, the greater the likelihood that brand new operating bases, complete with enlarged fuel storage tanks, may be built in the near future. If minimum reserve storage needs can be met in this way, then tanks need not be installed at existing facilities. On the other hand, because small systems usually cannot afford such substantial capital investments replacing old tanks with new or used equipment may be easier to implement and more cost effective.

The preliminary screening of on-base tank storage alternatives will include many of the same concerns as those described for new off-base construction. In particular, managers should spend time thinking about:

- Which bases are the most likely candidates.

- How much identified storage deficits could be supplemented by additional on-base capacity.

- Probable duration and costs of disruption.

- Projected economic and operational benefits of larger tanks.

- The long-term impacts of on-base storage on fuel reserve security.

STEP 4. SELECT TWO TO THREE FUEL RESERVE OPTIONS.

Objective: Narrow down final reserve storage alternatives.

Summary of Tasks:

- Identify alternatives reasonably consistent with preliminary storage planning criteria.
- Initiate detailed feasibility analyses.

Narrowing Down the Alternatives

With the completion of Stages I and II, managers should have a thorough grasp of:

- The nature and extent of emergency fuel supply strengths, weaknesses and needs.
- The full range of fuel reserve storage and other emergency supply alternatives currently available.
- The degree of which various alternatives match the preliminary planning criteria tailored specifically to the system.

More importantly, they will have begun to develop clear-cut preferences for specific alternatives and, wherever appropriate, special fuel reserve storage sites. At this point it is time for managers to focus on two or three viable options, analyze their comparative advantages and disadvantages, and prepare to choose an implementation strategy. These options can be drawn from one or more of the following fuel reserve categories:

- Independent assured supply contracts.
- Lease -- existing reserve storage.
- Purchase -- existing reserve storage.
- Newly constructed reserve storage.

The guidelines established by preliminary planning criteria will be very helpful here. Reflect again on these volume, location, design, cost and timing considerations. Having completed a system-wide inventory of reserve storage needs and expansion resources and opportunities, critically reassess the validity of these criteria and revise them if necessary. Very often, managers will discover that the initial alternatives screening process has stimulated shifts in transit fuel reserve priorities and policy objectives. Thus, certain planning criteria may have changed as well.

The alternatives selected as final transit fuel reserve options ideally should provide managers with some flexibility of choice. Also, regardless of how many options are developed they should all be site-specific. For example:

- Secure 400,000 gallons worth of assured diesel fuel supply contracts with one or more independent firms within a 50-mile radius of the transit property (specify firms if possible).

- Install enlarged fuel tanks at existing operating bases to ensure the reserve availability of 30,000 gallons of diesel fuel at all times (specify which bases; new or used equipment).

- Lease 150,000 gallons worth of emergency fuel storage from current fuel supplier(s) (specify suppliers).

- Acquire a centralized site and construct a new transit reserve storage tank farm with one million-gallon capacity (specify parcels and neighborhoods).

- Purchase abandoned gasoline stations and convert existing tanks to ensure 20,000 gallons of transit storage (specify sites and neighborhoods).

Feasibility Studies

Once identified, the feasibility of each alternative must then be assessed both individually and in comparison to other options. Managers, assisted by task force study staff, may want to initiate this analysis in-house utilize a private consultant. Either way, the in-depth feasibility studies should focus on the various advantages and disadvantages associated with particular alternatives:

- Financial obligations and impacts.

- Operational features.

- Regulatory requirements.

- Environmental and community effects.

The next section of the guidebook describes what the primary advantages and disadvantages of each strategy are and how transit systems should proceed to select the most secure, efficient and cost-effective storage option.

CHAPTER 4

STAGE III. EVALUATING FUEL RESERVE STORAGE ALTERNATIVES

Introduction

The third phase of transit fuel reserve planning involves the detailed analysis of proposed storage alternatives. In particular, managers should compare the potential consequences, both positive and negative, associated with independent assured supply contracts; and lease, purchase or new construction of storage facilities. These advantages and disadvantages are summarized in Figure 4-1. The most important evaluation factors include:

- Financial costs and savings.
- Operational efficiency.
- Regulatory and permitting requirements.
- Community and environmental impacts.

There are four basic steps to assist the objective comparison of reserve storage options given these factors (Table 4-1):

- Evaluate assured supply contract
- Review the consequences of leasing existing fuel storage.
- Review the consequences of purchasing existing fuel storage.
- Consider the consequences of constructing new fuel storage.

STEP 1. EVALUATE ASSURED SUPPLY CONTRACT OPTIONS

Objectives: Determine the advantages and disadvantages of expanding private emergency fuel supply arrangements.

Summary of Tasks:

- Consider financial obligations and impacts.
- Address operational features.

Financial

Transit managers interested in expanding emergency fuel supplies made available through private contracts or government allocation programs first must confront the issue of cost.

Figure 4-1 **Potential Advantages and Disadvantages of Transit Fuel Reserve Alternatives**

TRANSIT FUEL RESERVE ALTERNATIVES — Potential ADVANTAGES

	FINANCIAL	OPERATIONAL	REGULATORY	COMMUNITY/ ENVIRONMENTAL
INDEPENDENT ASSURED SUPPLY	• Low Cost	• Tailor-made transit fuel supply arrangements possible • Participation flexible over time	• None	• None
LEASE EXISTING FACILITY	• Short-term committment feasible • Low operational/maintenance costs • Limited liability	• Flexible facility size • Quick start up feasible	• Minimum new permits may be required • Permit burden on lessor, not lessee	• Neighborhood character unlikely to be significantly altered • Prior community acceptance of fuel storage use probable • Minimum of significant adverse impacts
PURCHASE EXISTING FACILITY	• Equity in ownership • Resale value • Good return on investment	• Flexible facility size • Total fuel management control	• Necessary permits may already be in place and often can be transferred or extended	• Minimum of significant adverse impacts • Neighborhood character unlikely to be significantly altered • Prior community acceptance of fuel storage use probable
CONSTRUCT NEW FACILITY	• Equity in ownership • Resale value • Federal capital construction grants available	• Ability to "overbuild" to accommodate future growth • State-of-the art design encouraged • On and Off-base construction options • Total fuel management control	• None	• Certain ecological or social impacts can be mitigated early on

TRANSIT FUEL RESERVE ALTERNATIVES — Potential DISADVANTAGES

	FINANCIAL	OPERATIONAL	REGULATORY	COMMUNITY/ ENVIRONMENTAL
INDEPENDENT ASSURED SUPPLY	• Fee incurred whether or not there is a "call" on fuel	• Ever-present threat of breach of contract • No direct fuel management control	• None	• None
LEASE EXISTING FACILITY	• Exposure to sudden lease rate hikes • No return on investment	• Appropriate sites may be limited • Risks of lease cancellation • Limited fuel management control • Uncertain supply security during a crisis	• Site-special codes and permit requirements may restrict use as transit fuel storage	• Environmental impacts may accompany major change in use • Small, but unpredictable, potential for public controversy
PURCHASE EXISTING FACILITY	• Fixed capital investment • Operating and maintenance costs • Opportunity costs of not investing capital elsewhere	• Storage to base fuel transport • Limited number of suitable off-base sites	• Permit requirements may be time consuming if no prior permits exist	• Environmental impacts may accompany major change in use • Moderate, but unpredictable, potential for public controversy
CONSTRUCT NEW FACILITY	• High fixed capital investment • Assumption of operating and maintenance costs • May necessitate municipal bond financing • Opportunity costs of not investing capital elsewhere	• Long lead time to start up • Limited number of suitable sites	• Time-consuming permit process (± 12 months) likely	• Unavoidable environmental impacts • High potential for public controversy

TABLE 4-1. EMERGENCY FUEL SUPPLY ALTERNATIVE EVALUATION STAGE CHECKLIST

- Step 1

  _____ Propose final options to expand assured fuel supply contracts.

  _____ Evaluate financial advantages and disadvantages.

  _____ Evaluate operational advantages and disadvantages.

- Step 2

  _____ Propose final options to lease fuel storage.

  _____ Evaluate financial advantages and disadvantages.

  _____ Evaluate operational advantages and disadvantages.

  _____ Assess regulatory advantages and disadvantages.

  _____ Evaluate potential environmental/community impacts.

- Step 3

  _____ Propose final options to purchase fuel storage.

  _____ Evaluate financial advantages and disadvantages.

  _____ Evaluate operational advantages and disadvantages.

  _____ Assess regulatory advantages and disadvantages.

  _____ Evaluate potential environmental/community impacts.

- Step 4

  _____ Propose final options to construct fuel storage.

  _____ Evaluate financial advantages and disadvantages.

  _____ Evaluate operational advantages and disadvantages.

  _____ Assess regulatory advantages and disadvantages.

  _____ Evaluate potential environmental/community impacts.

In the private sector, costs will vary depending on the volume of fuels to be stockpiled, the level of storage capacity available, tank maintenance fees and the projected expense of transporting fuels to the base. Generally, such costs are low. In addition, if and when contract reserves are ever activated during an emergency, the transit property would be obligated to pay an inflated crisis market price for gasoline or diesel fuels.

Operational

Private supply contracts suffer from one major operational flaw: they do not provide transit systems with direct and total management control over emergency fuel supplies. As noted previously in this guidebook, even if a private supplier has a strong economic incentive to deliver reserves committed by contract, and faces penalties for any failure to do so, the guaranteed security of these fuels still may be questionable. For example, private suppliers might suddenly default on all or part of their contractual commitments in a crisis situation, leaving managers with inadequate fuels on hand.

STEP 2. REVIEW THE CONSEQUENCES OF LEASING EXISTING FUEL STORAGE.

Objective: Identify the advantages and disadvantages of acquiring additional fuel reserve storage capacity through leasing.

Summary of Tasks:

- Consider financial and operational aspects.
- Look at regulatory requirements.
- Examine potential environmental and community effects.

Financial

Transit systems thinking of leasing fuel storage facilities must be willing to endure a landlord-tenant relationship. As tenants, managers will be bound by contracts specifying rental fees and other terms under which the facility can be used to store diesel or gasoline fuels. Landlords may be private oil companies, refineries or other independent firms with tanks to lease.

One negative financial feature of leasing is that storage fees are seldom inexpensive or uniform. Besides the cost of fuel itself, surcharges for transportation, maintenance, labor, taxes, insurance and equipment may be built into rental rates set by the lessor; in some cases, however, the lessee (a transit property) must bear some of these costs as an additional expense.

Yet, depending on the financial resources available to be spent on storage, leasing can be cost-effective. For example, specially-tailored lease agreements may be negotiated that fall within the system's budget. The market is also fairly competitive, thereby offering a reasonable range of choice.

Flexibility is another hallmark of leasing. This may be important where a fuel reserve storage scheme is being launched on an experimental basis. Certain transit systems with short-term reserve planning goals are likely to identify more affordable opportunities to meet their reserve needs via leasing than any other alternative.

On the side of disadvantages, leasing means that the system sacrifices gaining financial equity. There is no prospect of a good return on investment. Also, the potential for future resale at a profit is eliminated.

Second, unexpected fee increases can occur over the course of a lease period. Lease cancellation represents another ever-present threat, and one that could easily catch a transit system totally unprepared.

Operational

What leasing does provide managers from an operational perspective is leeway with respect to start up and location of storage. Where the local lease market is diverse, and numerous opportunities exist to negotiate short- or long-term contracts, the transit property can probably find more than enough leased storage capacity suiting its needs. However, local circumstances will determine the extent to which appropriate sites are available.

The last operational issue concerns fuels management control under leasing. First, regardless of the facility chosen, the transit property can only hope to exert indirect fuels management authority. Thus, systems may be vulnerable to fuel mixing or accidental contamination problems, poor record keeping and cumulative leakage losses beyond the ability of a manager to monitor or control. Besides quality assurance, managers usually will not be guaranteed 24-hour access to supplies unless a special lease clause provides it.

Regulatory

One major advantage to leasing an existing fuel storage facility is that the various applicable health and safety, environmental, building and zoning, and land use certifications are already in place. This means a transit property can avoid the time-consuming job of receiving the necessary planning permits.

On the other hand, should a significant change in facility use be proposed (say, the start up of a storage tank that has been dormant for quite some time), certain new permits might be required. Luckily, however, the lessor, not the transit operator is responsible for obtaining these permits.

Environmental/Community Impacts

If a fuel reserve storage site leased by a transit system is already operational and meets minimum regulatory requirements, there is little likelihood of significant environmental or community impacts. Unlike many other reserve storage alternatives, the incidence of major planning controversies will be few and far between. Prior community acceptance, accompanied by minimal ecological disturbances, make leasing options quite attractive in this respect.

STEP 3. REVIEW THE CONSEQUENCES OF PURCHASING EXISTING FUEL STORAGE.

Objective: Explore the advantages and disadvantages of buying a fuel reserve storage facility.

Summary of Tasks:

- Address financial and operational aspects.
- Review regulatory requirements.
- Consider potential environmental and community impacts.

Financial

The leading economic advantages of buying an existing fuel storage facility are:

- Equity rights accompanying ownership.
- Good return on investment.
- Potential fuel cost savings.
- Future resale value.

For most operators, the fee simple acquisition of storage will constitute a major capital expenditure. Numerous overhead and maintenance costs must be assumed as well. Yet the impact of these cash outlays are often outweighed by the "invisible" long-term benefits that flow from owning a facility outright.

For example, a property may in time recover at least a part of its initial costs simply through land price inflation alone. Also, the facility's market resale value may be expected to rise--perhaps substantially--over the long term. If this occurs, and the transit system eventually chooses to sell, substantial profit is possible.

Other capital investment costs can be recouped in the form of bulk fuel purchase savings. Large quantities of diesel and gasoline fuels are usually available from independent suppliers at discount prices. Alternatively, fuels can be purchased at lower prices on the spot market. Where storage volumes permit, such dollar savings over time may be substantial enough to ensure a better than average investment payback.

One of the biggest financial disadvantages of buying an existing fuel reserve--aside from the initial capital expenditure--is the system's assumption of retrofit, overhead and maintenance costs. Depending on the facility's physical condition, design and construction, remodeling may be extensive and costly in order to upgrade the reserve. Ownership also means that managers must cover additional expenses such as:

- Taxes.
- Labor.
- Insurance.
- Maintenance.
- Security.
- Transportation.
- Utilities.

Until such time as the reserve storage facility is sold, these expenses represent permanent financial obligations.

Operational

Any transit system that buys its own fuel reserve storage facility reaps a number of operational benefits. Most of these benefits are related to fuel management control and include authority over:

- How large a fuel stockpile is maintained.
- Who can gain access to reserves.
- The assured quality of fuels stored.
- Record keeping procedures.
- The logistics of emergency supply transportation.

In essence, ownership confers the broadest possible range of reserve fuels management rights and responsibilities on a manager.

Operational disadvantages, in contrast, are minimal. About the only concern is whether a system-owner has the necessary budget, technical know-how, and administrative sophistication required to run the fuel reserve facility effectively. Clearly a decision to buy ought not be made hastily. After all, once the purchase is finalized, managers will be deeply committed to demonstrating the worth of the investment. Thus, they should be well prepared to assume all rights and responsibilities associated with ownership.

Regulatory

Most reserve storage acquisitions through purchase will be made from currently operational tank facilities or else tanks and facilities which are deactivated or surplused. Transit managers should be aware that they may encounter time-consuming permit requirements depending on which storage option is chosen. In general, there are certain regulatory advantages attached to purchasing operational facilities rather than tanks out of use.

The central issues from a regulatory perspective are:

- What miminum local, state and federal permits, certifications and authorizations apply to diesel and/or gasoline fuel storage facilities?
- To what extent do existing storage facilities for sale already meet these requirements? Which permits can be extended? How easily?
- How lengthy are the projected permitting procedures required for specific reserve storage facilities?

The greater the number of permits required to activate a transit fuel reserve, and the longer it takes to process them, the more severe are the disadvantages affecting the owner-operator. Unless a manager is willing to endure a rigorous--and potentially

frustrating--journey through the regulatory maze, existing facilities equipped with up-to-date regulatory certifications are to be preferred.

For the sake of an example, assume that among the purchase options is a chance to buy either a small operational tank farm or a deactivated service station.

In the first case, many of the mandatory regulatory authorization probably will be in effect, covering conformance to:

- Health and fire safety codes.
- Building and zoning codes.
- Water discharge regulations.
- Oil spill contingency planning requirements.
- Air pollution regulations.
- Fuel transportation regulations.

If the storage facility meets a property's emergency supply needs, and is affordable, then many necessary permits can simply be renewed or extended upon acquisition. On the other hand, a major change in use, such as the proposed storage of highly volatile fuels, the addition of new tanks, or greatly expanded transport activities in the immediate vicinity could create regulatory complications. The degree to which a transit reserve might significantly alter local conditions, or fail to meet terms of currently applicable permits and authorizations, will determine how complicated and time consuming the regulatory approval process is likely to be.

In the case of a deactivated facility, however, necessary permits may have lapsed and new permit applications would have to be resubmitted. Revised land use restrictions might today pose severe obstacles to fuel reserve storage at a service station site that did not exist previously. Thus, because necessary approvals and authorizations are so unpredictable, caution must be exercised when contemplating the purchase of abandoned or deactivated fuel storage sites.

Environmental/Community Impacts

Operators run a fairly low risk of causing adverse environmental effects, or significantly disrupting a surrounding community, when they purchase an existing fuel storage site. However, this depends on how active the facility is and how transit fuel storage might change the character of these operations in terms of:

- Fuel types stored.
- Traffic levels.
- Air and water pollution.
- Noise.
- Safety hazards.
- Impacts on community activity patterns.

If major operating changes are envisioned under transit ownership or extensive renovation/redesign may significantly alter the physical site, then the advantages of purchasing an existing facility are less impressive. In fact, the transit manager may face many of the same problems accompanying new construction (see Stage III, Step 4 below).

STEP 4. CONSIDER THE CONSEQUENCES OF CONSTRUCTING TRANSIT FUEL RESERVE STORAGE.

Objective: Explore advantages and disadvantages of building a new off-base fuel reserve.

Summary of Tasks:

- Address financial and operational aspects.
- Review regulatory requirements.
- Consider environmental/community impacts.

Financial

The financial advantages associated with constructing an off-base reserve storage facility are similar to those benefits discussed above under storage purchasing, e.g., equity in ownership, resale value, fuel cost savings. The disadvantages are also similar aside from the fact that initial capital costs may be defrayed by government grants. However, the potential disadvantages of construction appear to outweigh the advantages. These include cash outlays for:

- Site acquisition.
- Site preparation.
- Planning/permitting.
- Tank equipment purchase (new or used), transportation and installation.

Operational

Building one's own reserve facility represents the ultimate in operator management of and control over emergency fuel supplies. Greater attention, for example, can be devoted to finding a site ideally located for use during any type of crisis. Perhaps most importantly, if brand new tank equipment is utilized, it will reflect state-of-the-art technology, probably be safer in terms of minimizing human and environmental hazards, and will last longer. Transit operators can also rest assured that adequate volumes of fuel are stored at all times, fuel quality is protected, and access is being regulated in the interests of their system alone.

From an operational standpoint, the most obvious disadvantage to construction is the lead time required to bring a storage facility from the design stage to the point of eventual construction and use. Considerable uncertainty surrounds time delays and the feasibility

of obtaining the necessary regulatory authorizations. As a result, managers must take a hard look at how long they can afford to wait before the new facility becomes operational.

Regulatory

The siting of a new transit fuel reserve facility--be it a large above-ground tank farm or a moderately-sized underground tank--will require numerous permits and authorizations. First, the proposed storage facility must conform to local building and zoning regulations governing permitted land uses, and height, bulk, set-back and other development restrictions.

Second, fire codes must be met. State and local governments normally impose regulations to guard the public against undue health and safety hazards. These regulations address the types of technical steps--transportation, maintenance and equipment, etc.--that are required (as a minimum) in order to operate a fuel reserve. Technical specifications differ depending on the types of fuel (gasoline and/or diesel) being stored.

Third, compounding the disadvantages associated with constructing a new transit reserve are numerous environmental protection regulations which will apply, administered by federal, state and local governments. These may include the following items, depending on where concentration would occur.

- Preparation of enviornmental assessments and/or full-fledged impact studies.
- Wastewater discharge emission permits.
- Air pollutant discharge emission permits.
- Dredge and fill permits.
- Shoreline/wetland development permits.

Thus, new construction presents a transit system with a complex, multi-level regulatory process which must be navigated before a facility can be built. At many places along the permitting spectrum, obstacles may stall the process often to the point of killing the project completely. The risks of failing to receive all necessary permits are high.

Environmental/Community Impacts

For a transit property to pursue construction of a fuel reserve, consideration also must be given to the potential environmental and community impacts that might result. Some of these impacts are covered by the regulatory process outlined above. Depending on the scale of the project (small tank vs. large tank vs. tank farm facility) and where it is located (inland or coastal site), certain ecological and socioeconomic disturbances will be unavoidable. As a result, a fuel reserve storage proposal may stimulate major and drawn-out public controversies over the extent of potentially significant adverse impacts and whether or not these impacts can be mitigated.

The advantages of construction are minimal from an environmental/community impact perspective. Admittedly, owing to the ability to install new tank equipment and incorporate up-to-date facility design, elements, the general environmental safety may be enhanced by new construction. Seldom, if ever, however, can all undesirable side-effects be overcome by increased safety factors alone.

The more sensitive a construction site is in terms of ecological values, the more difficult it becomes to avoid causing environmental disruptions. Near a heavily-populated residential area, or popular recreation zones for example, the proposed siting of a new reserve facility is bound to alter the neighborhood fabric and create community frictions. Some of the potentially adverse impacts include:

- Noise, dirt and traffic congestion during the building phase.
- Displacement of plants and/or animal habitat.
- Long-term air pollution (facility and associated transportation activities).
- Visual intrusions.
- Fuel spill risks--routine and catastrophic.
- Water pollution (often related to spills).
- Fuel ignition risks.

These and other potential environmental impacts need to be considered by managers interested in building a new fuel reserve storage facility. Depending on the designated site, of course, the nature and severity of projected impacts will vary significantly. Not all locations appropriate for construction need cause irreversible degradation to sensitive ecosystems or harm to residential neighborhoods. In fact, many identified impacts can be mitigated, both during the construction period (short term) and once storage operations commence.

To evaluate the possible environmental and community concerns associated with a proposed fuel storage site managers should:

- Run all potential sites through a basic environmental impact checklist available from state or local government authorities.
- Rank and quantify, if possible, anticipated ecological and socioeconomic impacts according to their short-term/long-term, direct/indirect, avoidable/unavoidable, reversible/irreversible nature.
- Determine which impacts can be mitigated and how.
- Project the prospects for community and local government opposition to a fuel reserve storage facility.

Finally, to aid the development of an environmental/community profile on proposed storage sites, transit systems may also want to establish an informal dialogue with local interest groups and public officials at some point. Managers willing to initiate these discussions can effectively utilize them to disseminate information on specific proposals, allay certain community fears about environmental and social impacts, and gather intelligence about the positions and organization of project opponents. In this fashion, transit properties will be better able to weed out storage proposals that are too controversial to be attempted; and to develop negotiation strategies for use later on in the fuel reserve site-planning process.

CHAPTER 5

CONCLUDING REMARKS

This report presented a detailed three-stage planning methodology to help transit managers assess and fulfill their emergency fuel supply requirements. Beginning with the inventory of all existing supply mechanisms, key steps useful for screening alternative reserve storage and emergency supply arrangements were outlined. In addition, the potential advantages and disadvantages associated with these alternatives were subjected to considerable discussion and analysis.

The guidebook intentionally falls short, however, of providing managers with a simplistic "quick-fix" methodology for implementing the best possible emergency fuel survey. For example, repeated emphasis throughout the report is placed on the need to tailor specific emergency supply strategies to the peculiar operational requirements and financial resources of individual properties. The often unpredictable role of prospective regulatory constraints and environmental/community impacts in limiting feasible options is also highlighted. This treatment is not meant to deter systems from exploring innovative emergency fuel options but merely to portray in advance a realistic picture of possible implementation obstacles. Managers still remain free to pursue as many different alternatives as they desire.

At the same time, a recurring theme here is that permanent fuel reserve storage established through leasing, purchasing, or new construction will give most transit properties the greatest degree of long-term emergency fuel security. This is especially true where existing reserve storage facilities can be purchased on the open market and brought under the direct management authority of the property.

Fuel reserve storage planning should be on the decision-making agenda of all transit systems, regardless of their size and perceived vulnerability to prospective supply short falls. As a resource tool, therefore, the guidebook will greatly assist managers in:

- Educating transit personnel to the issues.
- Stimulating deliberate emergency fuel planning.
- Identifying feasible and cost-effective storage options.
- Enhancing the security of long-term transit fuel supplies.

APPENDICES A - H

APPENDICES

A. SUMMARY OF KEY TRANSIT FUEL RESERVE PLANNING STEPS AND RELATED TASKS

B. GLOSSARY OF KEY TRANSIT FUEL RESERVE PLANNING TERMS

C. FUEL RESERVE STORAGE INVENTORY WORK SHEETS

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E. CHECKLIST OF POTENTIAL DEVELOPMENT PERMITS AND AUTHORIZATIONS REQUIRED FOR LAND AND WATER-BASED TRANSIT FUEL RESERVES

F. SAMPLE FUEL STORAGE AND LICENSE AGREEMENT

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APPENDIX A

SUMMARY OF KEY TRANSIT FUEL RESERVE PLANNING STEPS AND RELATED TASKS

STAGE I. TAKING STOCK OF EMERGENCY TRANSIT FUEL RESERVES

Step 1. Inventory the Property's Current Emergency Fuel Supply Arrangements.

- Determine the amount of fuel now stored on or off base in excess of day-to-day operating requirements.
- Calculate the extent of under-utilized tank storage capacity.
- Review fuel supplies assured under contracts with independents.

Step 2. Establish Minimum Fuel Reserve Storage Standards.

- Determine exactly how much fuel should be maintained on hand in reserve storage or within reach for use during emergencies.
- Compare recommended supply levels with existing fuel reserve storage and allocated or assured supply arrangements.

Step 3. Assess the Nature and Significance of Storage Deficiencies.

- Profile the extent of fuel reserve storage volume deficits.
- Examine reliability and security-of-access concerns.
- Evaluate the status of fuel reserve quality control mechanisms.
- Develop a fuel reserves alternatives study.

STAGE II. DEVELOPING TRANSIT FUEL RESERVE ALTERNATIVES

Step 1. Develop an Emergency Fuel Reserve Policy and Set Out Preliminary Planning Criteria.

- Make a commitment to the fuel reserve planning exercise.
- Establish preferred storage requirements in terms of volume; tank location and design; security of access; and cost and timing, etc.

Step 2. Assess the Opportunities for Negotiating Assured Emergency Fuel Supply Contracts.

- Review the options for securing assured emergency fuel contracts with independent suppliers.

Step 3. Survey Opportunities to Lease, Purchase, or Construct Additional Fuel Reserve Storage.

- Contact potential sellers of new and used tank equipment.
- Identify potential sellers or lessors of existing tank storage facilities.
- Research the real estate market for commercial/industrial land parcels for sale.

Step 4. Select Two or Three Fuel Reserve Options.

- Identify alternatives reasonably consistent with preliminary storage planning criteria.
- Initiate detailed feasibility analyses.

STAGE III. EVALUATING FUEL RESERVE STORAGE ALTERNATIVES

Step 1. Evaluate Assured Supply Contract Options.

- Consider financial obligations and impacts.
- Address operational features.

Step 2. Review the Consequences of Leasing Existing Fuel Storage.

- Consider financial obligations and impacts.
- Look at regulatory requirements.
- Examine potential environmental and community effects.

Step 3. Review the Consequences of Purchasing Existing Fuel Storage.

- Address financial and operational aspects.
- Review regulatory requirements.
- Consider potential environmental and community effects.

Step 4. Consider the Consequences of Constructing Transit Fuel Reserve Storage.

- Address financial and operational aspects.
- Review regulatory requirements.
- Consider potential environmental and community impacts.

APPENDIX B

GLOSSARY OF KEY TRANSIT FUEL RESERVE PLANNING TERMS

Fuel Reserve Storage

A permanently maintained stockpile of gasoline and diesel fuels available for diversion to transit operations during emergency periods.

Operational Demand

The gallon volume of fuel utilized to maintain regularly-scheduled transit service, normally measured on a monthly or annual basis.

Spot Market Fuel Purchases

The practice of buying specific volumes of fuel on the open market from wholesale and retail suppliers. These supplies are not tied to any fixed-price and/or quantity contracts.

Storage Leaseback

Arrangement by which all or part of a reserve tank facility, once purchased or constructed by a transit property, is then leased out at a fee to various private and public entities as storage for their own gasoline or diesel supplies.

Performance Bond

An up-front payment by a private diesel or gasoline fuel supplier that is recoverable by the transit property should fuels committed under contract not be delivered according to contract specifications.

Fuel Storage Co-mingling

A fuel storage practice whereby gasoline or diesel supplies of varying grades, refinery quality and technical specifications are mixed together in the same tank.

Fuel Rollover

Fuels management practice whereby stored supplies are systematically drawn down from a reserve over time and transferred to operational use.

APPENDIX C

FUEL RESERVE STORAGE INVENTORY WORK SHEETS

OFF–BASE EMERGENCY FUEL STORAGE AND
ALLOCATION/ASSURED DELIVERY COMMITTMENTS EVALUATION SHEET

OFF–BASE FUEL SUPPLY SOURCE	EMERGENCY FUEL SUPPLY (GALLONS)						Estimated Number of Days Emergency Supply	
	Existing		Proposed		Existing Plus Proposed			
	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline
OWNED FACILITY ● Site A ● Site B								
LEASED FACILITY ● Site A ● Site B								
INDEPENDENT ASSURED SUPPLY CONTRACTS ● Firm A ● Firm B								
OFF–BASE TOTAL								

OWNED AND LEASED EMERGENCY FUEL RESERVE
STORAGE EVALUATION SHEET

Storage Type / Fuel Type	Existing Fuel Reserve Capacity (Gallon Volume)		Operational Fuel Demand per Month (Gallon Volume)		Estimated Number of Days Emergency Supply Available		Required Additions to Fuel Reserve Capacity (Gallon Volume)	
	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline
OWNED STORAGE • Site A • Site B • Site C								
TOTAL								
LEASED STORAGE • Site A • Site B • Site C								
• TOTAL								
GRAND TOTAL								

ON–BASE EMERGENCY FUEL RESERVE STORAGE
INVENTORY AND EVALUATION SHEET

ON–BASE STORAGE SITE	FUEL STORAGE VOLUME (GALLONS)						Estimated Number of Days Emergency Supply	
	Existing		Proposed		Existing Plus Proposed			
	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline
• BASE A								
• BASE B								
• BASE C								
• BASE D								
ON-BASE TOTAL								

APPENDIX D

SAMPLE ASSURED FUEL SUPPLY CONTRACT

This agreement is entered into this ___ day of _____ 19___ by and between X Oil Corporation (hereinafter XOC) and the Municipality of Metropolitan Seattle, a municipal corporation (hereinafter Metro), upon terms and conditions set forth herein and for valuable consideration.

I.

XOC warrants that it will supply Metro approximately 1,000,000 gallons of #2 diesel fuel to Metro specifications, to be lifted ratably over a ninety-day period in the event Metro's primary supplier is unable to supply quantities of diesel in accordance with the terms and conditions of the extant supply agreement between Metro and its primary supplier. The price for such diesel fuel shall be XOC's posted F.O.B., XOC's facilities.

II.

In consideration of this warranty, Metro shall pay XOC the sum of $400.00 per month commencing the __ day of _____ 1982 and payable on the ___ day of each succeeding calendar month thereafter.

III.

The term of this agreement shall be _____ months from the date of its execution. At the conclusion of the initial term, the parties may elect to continue this agreement on a month-to-month basis, under the same terms and conditions, by mutual agreement in writing. During this subsequent month-to-month term either party may terminate this agreement by giving the other party notice in writing at least (30) days in advance of such termination date.

IV.

Extent of Warranty. XOC represents to Metro that it has approximately 750,000 gallons of diesel storage and/or diesel supply in or near the Seattle Metropolitan Area. At such time as Metro requires performance under this agreement, XOC shall accord Metro paramount status among its customers and shall allocate to Metro its entire diesel supply (if less than one million gallons) to fulfill its warranty to Metro.

Limitation of Liability. The foregoing notwithstanding, the parties specifically agree that XOC shall not be liable for incidental or consequential damages suffered by Metro or third parties occasioned by XOC's inability to perform or non-performance of this agreement. In the event of breach or non-performance by XOC, XOC shall pay as liquidated damages and Metro shall be limited to such damages as follows:

(A) In the event XOC is only able to provide 750,000 gallons of fuel to Metro, the sum of $4,800 plus interest at the maximum rate allowable by law will be repaid to Metro.

(B) In the event XOC is only able to provide 500,000 gallons of fuel to Metro, the sum of $15,000 plus interest at the maximum rate allowable by law will be repaid to Metro.

(C) In the event XOC is only able to provide 250,000 gallons of fuel to Metro, the sum of $30,000 plus interest at the maximum rate allowable by law will be repaid to Metro.

(D) In the event XOC has difficulty providing Metro with proportionate amounts of fuel, see above, on the subsequent month-to-month terms of this agreement, then the same penalties as indicated above will apply.

VI.

This writing contains the entire agreement of the parties and it shall not be modified or altered except by subsequent agreement of the parties in writing executed in conformance with the requirements of law.

Dated: _____

MUNICIPALITY OF METROPOLITAN SEATTLE

By: _____

Title:

Dated: _____

X OIL CORPORATION

By: _____

Title:

APPENDIX E

CHECKLIST OF POTENTIAL DEVELOPMENT PERMITS AND AUTHORIZATIONS REQUIRED FOR LAND AND WATER-BASED FUEL RESERVES*

Federal

- Environmental Impact Assessment
- U.S. Army Corps of Engineers Navigable Waters Alternation/Obstruction Permit (Section 10 Permit)
- U.S. Army Corps of Engineers/Environmental Protection Agency (EPA) Wetland Dredge and Fill Permit (404 Permit)
- Spill Prevention and Countermeasure Plan (EPA)
- U.S. Coast Guard Petroleum Transportation, Offloading and Inspection Regulations (33 CFR 154-156)

State

- National Pollution Discharge Elimination System Permit (401 Permit/NPOES)
- Environmental Impact Assessment
- Coastal Zone Facilities Sitting Permit
- Wetland Construction Permit

Regional

- Air Pollution Control Notice of Construction
- Air Pollution Control "New Source" Performance Standards
- Flood Plain Permit
- Wastewater Discharge Permit

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* This list was originally developed for Seattle Metro and, therefore, may change from one state or local context to another.

Local

- Shoreline Development Permit
- Environmental Assessment
- Land Use and Zoning Permission
- Structural Bulk and Height Authorization
- Noise Control Ordinances
- Building Code Permits
  - -- Occupancy
  - -- Water/Sewer
  - -- Fire Safety
  - -- Electrical
  - -- Street Use
  - -- Plumbing

APPENDIX F

SAMPLE FUEL STORAGE AND LICENSE AGREEMENT

STORAGE AND LICENSE AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____ 19__, by and between _____ (hereinafter referred to as "Operator"), a corporation incorporated and existing under the laws of the State of _____ and _____ (hereinafter referred to as "Customer"), a corporation organized and existing under the laws of the State of _____

WHEREAS, Operator is the owner of certain terminal storage facilities and whereas, Customer desires to obtain permission to place its hereinafter described products therein; the parties hereto agree as follows:

1. FACILITIES AND TERM: Operator does hereby agree to provide and Customer does hereby agree to accept certain terminal storage facilities and handling services, at _____ as set forth in the schedule(s) attached, and as hereinafter provided. This agreement shall be for a term of _____, beginning on the ___ day of _____ 19___, and continuing through the ___ day of _____ 19__.

1.1 Customer warrants that he has examined and inspected Operator's tanks, pipelines and equipment and the dock, rail and truck facilities, and that Customer is fully aware of the limitations and condition thereof, and has independently concluded that said facilities are acceptable for the storage and handling of products as provided for herein. Operator reserves the right at any time or times during the term of this Agreement to substitute other suitable premises and facilities in lieu of those designated herein for the storage and handling of Customer's products. Customer further warrants and represents that Customer shall be the sole legal and beneficial owner of all products at any time delivered by Customer to the tanks, warehouse or other facilities herein provided for, and that all such products shall be free from all liens and encumbrances of any nature whatsoever until such products are delivered by Operator back to Customer from Operator's facilities hereunder.

2. PRODUCTS STORED: Customer shall use the facilities furnished hereunder for the storage and handling of only the products specified in said schedule(s) and as hereinafter described, provided, however, that anything in this Agreement to the contrary notwithstanding, Customer shall not store and/or handle or cause to be stored and/or handled in any of these facilities (a) any product containing hydrogen sulphide or other corrosive materials, (b) any product which in any way would be injurious to any of these facilities, or (c) any produce which would render any of these facilities unfit, after cold water rinse cleaning, for the proper storage and/or handling of water white oils. Customer shall at its sole cost and expense be responsible for any cleaning or the repair of damages resulting from the storage and/or handling in any of these facilities of any product, which may not be stored and/or handled therein under the terms hereof.

3. SERVICES PROVIDED: Subject to the terms and conditions herein, Operator agrees to provide all labor and equipment necessary to receive the products specified in the attached schedule(s) for storage and to remove them from storage for delivery as Customer may require. Provided that Operator shall not be obligated to provide equipment for receipt or delivery of products which is not already in place at the above described facility.

3.1 All services hereunder shall be provided as follows:

(a) Shipments to and from tank car and transport truck shall be performed during normal working hours; which shall be _____ a.m. to _____ p.m., Monday through Friday, holidays excepted. Tank cars and transport trucks shall be handled on a first arrival-first serve basis, but Operator is not liable for any delays or resulting damages caused thereby.

(b) Vessel loading and unloading shall be handled on a 24 hour basis but shall be limited to the actual hours necessary to dock and load or unload a vessel at its normal loading rate. If employees of Operator stand by due to periods of time when a vessel is not engaged in loading operations either because the vessel is late in arriving at its berth or because it is prevented from loading or unloading at its normal rate due to causes beyond Operator's control, such time shall not be covered by the monthly rental fee, and charges for this time shall be made according to the provisions for excess hours as set forth in section 3.3 below. Operator shall make a berth and dock available at the terminal for loading and unloading of vessels up to _____ feet in length, with a draft of no more than _____ feet. Vessel arrivals shall be coordinated by Customer with Operator's Terminal Manager. If more than one vessel requires the use of a particular berth during the same period, priority shall be given to the first user to arrive at the dock space unless exigent circumstances require otherwise. Operator shall not be liable for delays in berthing loading or unloading vessels.

(c) There shall be no intra-terminal tank transfers, (unless done for convenience of Operator pursuant to paragraph 1.1) and/or blending services performed by Operator unless such activity is specifically provided for in the attached schedule.

(d) Common carrier pipeline transfers shall be on a 24 hour basis. If Operator's employees stand by due to a delay in arrival of tender, such time shall not be covered by the monthly rental fee and charges for this time shall be made according to paragraph 3.3 below.

3.2 Except as noted herein or in the attached schedule the services described in paragraph 3.2 shall be included in the monthly rental fee set forth in the attached schedule, which fee shall be paid monthly in advance commencing on the first day of the term hereof unless otherwise provided in the schedule attached.

3.3 Should Customer require services and Operator be able to provide same at other than the hours provided above, Customer agrees to pay to Operator, in addition to the monthly rental fee; 1) a labor charge, which shall be $_____ per hour for normal working hours and $_____ per hour for overtime hours for each such man hour worked by employees of Operator, and 2) an overhead charge calculated at 10% of the labor charge. In the event that Operator's actual labor costs increase during the term of this contract, Operator shall have the right to adjust the above labor charge to cover those costs upon notice to Customer. The term "actual labor costs" as used in this paragraph shall include wages, overtime, contributions to Social Security, Unemployment and Workmen's Compensation, and employee benefits.

3.4 If this agreement is for a term greater than one year, the monthly rental fees and all other charges set forth in the attached schedule(s) shall be adjusted annually on the anniversary date of the effective date of this agreement by multiplying the then current monthly rental fees and all other charges set forth in the attached schedule(s) by a fraction of which the numerator is the U.S. Department of Labor's National Consumer Price Index for the month preceding the anniversary month and the denominator of which is the same index for the same month in the preceding year.

Operator shall perform the calculation necessary and determine any such increased fees and charges and shall notify Customer thereof. Until receipt of such notification from Operator, Customer shall continue to pay the previously reflected monthly fees and charges and shall pay any excess upon later notification. In the event that the U.S. Department of Labor's National Consumer Price Index shall have declined for any given period, the monthly rental fees and all other charges set forth in the attached schedule(s) shall be the same fees and charges as for that preceding month.

If for any reason, the U.S. Department of Labor shall discontinue publication of the National Consumer Price Index during the term of this Agreement, the Operator shall give 30 days written notice to the Customer, of the use of an alternate index of changes in the general economy which would be applicable. If the Customer delivers to Operator a notice of rejection of the Operator's choice of an alternate index of changes in the general economy within 15 days from receipt by Customer of Operator's written notice thereof, both parties herein shall be bound by an index to be applied to the formula herein as determined by an independent commercial appraiser selected by both parties, with the costs of such determination to be borne equally by both parties.

3.5 Customer asserts no claim for the use of Operator's facilities except as expressly provided in this Agreement. Customer will use the dock, tank car and transport truck facilities as hereinabove provided only for loading or unloading product into Operator's facilities and will not utilize said dock, tank car or transport truck space before or beyond the period reasonably required for actual loading or unloading. All other areas are closed to Customer except when accompanied by a representative of Operator and upon Customer's execution of a Hold Harmless Agreement acceptable to Operator.

3.6 Cargoes from tankers and barges shall be received at the rate tendered by the vessel's pumps at a pressure of _____ to _____ lbs. p.s.i. at the flange connecting shorelines to the vessel.

3.7 Customer shall give Operator at least ____ days written notice prior to the expected date of the arrival of any vessel or pipeline tender to be tendered by the Customer for loading or unloading, shall keep Operator advised of the progress thereof until arrival, and shall notify Operator at least 24 hours in advance of the exact time of arrival of the vessel or pipeline tender.

3.8 While on Operator's terminal premises, Customer shall comply at all times with any and all rules established by Operator and with all governmental statutes, ordinances, rules, regulations, orders or requirements concerning air quality, water quality, or waste standards or controls imposed on or relating to the operation and use of the terminal facilities.

4. ACCOUNTING FOR PRODUCT: The quantity of product received into or withdrawn from storage tanks shall be determined by Operator's representatives, or at Operator's election, a licensed inspector, by checking and gauging said tanks at the time of receipt or withdrawal of said product, but not more often than once per day. Customer may participate, but in the absence of such participation, gauges taken by Operator shall be presumed to be correct, unless such gauges can be proved to be in error. However, quantities delivered to rail tank cars or transport trucks may be determined by reference to mutually agreed upon calibration charts of the rail car or truck tanks. In the event of any disagreement as to quantities of material received or withdrawn, the issue shall, upon written notice of either party to the other be submitted to one arbitrator to be appointed by the American Arbitration Association for hearing and decision, with the hearing to be held in _____, which decision shall be rendered within thirty (30) days from the date of the conclusion of the proceedings, and shall be final and binding upon the parties hereto. The cost and expense of the arbitrator shall be borne equally between the parties hereto.

4.1 If requested by Customer, Operator will take samples from ships, barges, rail tank cars, automotive tank trucks and storage tanks and make such samples available to Customer at Operator's facilities hereunder. The cost of containers for such samples and all other expenses suffered by Operator in connection with the taking and delivery of samples, shall be paid to Operator by Customer each month upon receipt of invoice from Operator. Samples shall be taken in accordance with reasonable procedures specified by Customer.

4.2 All quantities of product delivered to or shipped from the terminal shall be calculated in gallons at sixty degrees fahrenheit (60°) in accordance with recognized temperature correction tables. The term "barrel" whenever used herein, means 42 U.S. gallons at sixty degrees fahrenheit.

5. TERMINATION DUE TO GOVERNMENT REGULATION: Should the County or City, in which Operator's facilities are located, or any other Governmental entity, local or federal, prohibit operation of any then existing facilities used in performing this Agreement, or in any way deprive Operator of the right to use any such facilities or provide services in connection therewith, or require the modification of such facilities or the construction of additional facilities to be used in performing this Agreement, this Agreement shall terminate at the option of Operator, unless Customer shall agree in writing within 15 days after receipt of Operator's written election to terminate this Agreement to pay for the cost of replacing any such facilities or property of which Operator was deprived, or for the cost of construction of such additional facilities, or for any other expenses necessary to meet the requirements of such Governmental entity, on terms acceptable to Operator.

6. PAYMENT AND INTEREST FEE: Customer agrees that fees and charges not paid within 30 days after presentation of Operator's invoice shall be subject to 5/6 of 1 1/2% intererst charge on the outstanding invoice balance. This monthly 5/6 of 1 1/2% charge is an interest fee and is not a remedy or an item of liquidated damages. All payments hereunder shall be made to Operator at its office at

_____

or at such other place or places as Operator may notify Customer in writing.

7. DUTIES ON TERMINATION: Customer agrees promptly upon expiration or termination of this Agreement to remove all of its material, either bulk or packaged, from Operator's premises. All such material not removed at the expiration or termination of this Agreement shall at Operator's option become the property of Operator, and Operator may dispose of such material.

7.1 Customer shall be responsible for any and all costs incurred by Operator at the expiration of the term hereof in removal and disposal of material and cleaning said storage tank/tanks and the related facilities provided for hereunder, sufficient to put said tank/tanks and facilities back into clean petroleum service for unleaded products. Cutomer shall pay Operator immediately after presentation to Customer of invoice for all such cleaning costs. Cost for cleaning said tank/tanks and related facilities shall include, but not be limited to costs related to supplies, permits, use of equipment, labor and supervision. Tank rentals hereunder shall continue until such cleaning and disposal is accomplished.

7.2 LABOR DISPUTE: In the event of a labor dispute between the Customer and Customer's employees or any other third party and such labor dispute impacts or impairs the functioning and operations of Operator's facilities, the Operator has the right to immediately terminate this Agreement. Once the Agreement is terminated and notice is sent to the Customer, Customer has thirty (30) days to remove its product from Operator's facilities from receipt of notice.

8. LOSSES: Operator shall not be liable for normal losses due to spillage and evaporation during normal handling of products. Operator shall not be liable for any delay or nonperformance hereunder or for evaporation, shrinkage, line loss, clingage, discoloration, contamination, bacterial action damage to or destruction of any property of Customer, or damage to, or destruction of the harbor or any of the facilities referred to herein when any of the foregoing is caused in whole or in part, by any act of God or public enemy, or by labor troubles, strikes, lockouts, nonavailability of labor, riots, fires, war, storms, explosions, breakdowns of machinery, equipment, materials or supplies to deliver the same, or other causes beyond its control, whether such other causes be the causes herein specifically provided for or not, and whether the cause is or is not existing on the date of this Agreement. Operator shall not, in any event, be liable for loss of or damage to Customer's property, except and only when caused by Operator's failure to use reasonable care in the safe-keeping and handling of Customer's property and further provided that claim is made in writing within 30 days after receipt of actual or constructive notice of any such loss or damages. It is mutually understood that the Operator is not responsible for any changes in the quality of the product stored which might occur in storage due to the possible effect of air, light, temperature or other natural or chemical happenings.

8.1 Losses of any product for which Operator is responsible hereunder shall be determined monthly/annually at the end of each month/monthly twelve (12) month period,

commencing with the date of the first receipt of such product by Operator hereunder, and also, at the time any abnormal loss occurs or is discovered. The extent of loss shall be computed by deducting the total withdrawals during the period for which the accounting is made, plus the stock on hand at the end of such period, from the sum of the total receipts during such period plus the stock on hand at the beginning of such period. Normal losses shall be presumed to be 1/4 of 1% per month of receipts plus maximum amounts in storage during the period for which accounting is made and such amounts shall be deducted from any claims for losses.

9. INSURANCE: Insurance, if any be desired by Customer, shall be carried by Customer at his own expense and for the benefit of both the Customer and Operator.

10. DEFAULT: Should Customer default at any time in the prompt payment of any of the monies due hereunder, or in the prompt performance and observance of any of the terms, or conditions of this License Agreement, and should any such default, not relating to the payment of money, continue for thirty (30) days or more after written notice thereof by Operator to Customer, or should Customer go into bankruptcy voluntary or involuntary, or be placed in the hands of a receiver, State or Federal, then, and in any such event, the minimum monthly fee for the whole unexpired term hereof together with all other accrued charges, shall, at the option of Operator, become immediately due and payable. In any such event, Operator shall also have the right, at its option, to terminate this Agreement. Customer hereby grants to Operator a security interest in all products at any time contained in the tanks, warehouse or other facilities herein provided for, as security for the payment of all the fees and other charges payable to Operator by Customer, whether now in existence or hereafter contracted or incurred; and upon any such default, Operator may, after 15 days notice by Operator to Customer, sell all or any portion of such products, at public or private sale, and Operator may be purchaser at such sale or sales. Customer agrees that by execution of this agreement Customer appoints and constitutes Operator as Customer's Attorney in Fact for the sole and limited purpose of executing on behalf of the Customer a financing statement evidencing such security interest in a form satisfactory for filing with the appropriate filing officer of the State of jurisdiction over Operator's facilities. Customer shall pay and indemnify Operator against all costs and charges, including reasonable attorney's fees, incurred by Operator for the sale of Customer's products as above provided, or for enforcement of any covenant or condition herein contained on the part of Customer to be kept or performed. The remedies of Operator herein provided for shall not be exclusive, but shall be cumulative and shall be in addition to all other remedies in its favor, at law or in equity.

10.1 DAMAGES: In consideration of the rates for monthly fees and other charges set forth herein (it being recognized that higher charges would be made but for the limitation of liability set forth in this paragraph) it is understood and agreed that Operator shall in no event be liable for more than actual cash value or _____ cents per gallon, whichever is less, for any product loss or damage. Operator shall not be liable for special or consequential damages, no matter how such loss or damage shall have occurred or been caused. Also, it is understood that to the extent that Customer has insurance reimbursing it for losses, Customer waives any claim or claim it may have against Operator on account for such losses.

12. COMMON USE OF PIPELINES: Customer understands that Operator may use the pipelines which are common multi-product clean lines that connect Operator's tanks

to the dock and truck loading facilities for clean petroleum and chemical products not belonging to Customer. Customer hereby approves such usage and releases Operator from any liability in connection therewith.

13. ASSIGNMENT: This Agreement shall be binding upon and inure to the benefit of the successors and assigns of each of the parties hereto; provided however, that Customer shall not transfer or assign this Agreement, in whole or part, without the prior written consent of Operator, and any such transfer or assignment made in violation of this paragraph shall be null and void and of no force or effect whatsoever.

14. This Agreement is complete and contains all warranties and representations which form the basis of this Agreement. There exist no other representations or warranties unless they are enumerated herein. No amendment or modification of this Agreement shall be effective or binding unless such modification is in a written form signed by both parties hereto.

15. Each numbered paragraph or clause herein to this Agreement stands on its own and if any numbered paragraph or clause is held to be invalid or unenforceable, such clause shall be held separated and severable from this Agreement and the remaining Agreement shall remain in full force and effect.

16. If a conflict arises between the specific meaning or application of a term, clause or paragraph of the Agreement language and the accompanying schedules; the language and specific meaning of the accompanying schedules shall control and be followed.

17. NOTICES: All notices from one party to the other shall be directed to the appropriate address below or such other address or addresses as either party shall notify the other in writing:

OPERATOR: _____

_____

CUSTOMER: _____

_____

18. OTHER CHARGES: All tools, charges and taxes for pipelines, wharfage and dock services shall be for the account of Customer. The wharfage and dockage fees shall be as posted by _____ from time to time.

IN WITNESS WHEREOF, this Agreement has been made and executed by the parties hereto as of the day, month and year first hereinabove written.

Attest:

OPERATOR/LICENSOR

_____
Secretary

_____
Its _____

CUSTOMER/LICENSEE

_____
Secretary

_____
Its _____

SCHEDULE TO STORAGE AND LICENSE AGREEMENT
DATED _____

TERMINAL:

CUSTOMER:

COMMODITY
TO BE STORED:

TERM:

STORAGE TANKS:

MONTHLY RENTAL FEE:

ADDITIONAL CHARGES:

SPECIAL PROVISIONS:

APPENDIX G

THE SEATTLE METRO EXPERIENCE IN TRANSIT FUEL RESERVE PLANNING

Introduction

The Municipality of Metropolitan Seattle (Metro) is a public agency responsible for mass transit operations and regional waste water management. Its geographic jurisdiction encompasses the city of Seattle as well as the surrounding King County area--a 2,128 square mile region roughly the size of the state of Delaware.

Metro's transit functions serve a population of 1,234,000. Ridership levels, which rose 11 percent between 1973 and 1980, approached the 65 million mark in 1982; preliminary projections forecast somewhere in the vicinity of 115 million riders per annum by the end of the century. The Metro bus system maintains a fleet of 1,000 diesel coaches and employs 1,985 drivers (885 part-time; 1,100 full-time). Approximately 7.5 million gallons of diesel fuel are consumed annually.

In July 1982, Metro purchased an existing 1.7 million gallon tank farm from the Chevron Oil Company to use as a transit fuel reserve. This facility, costing $2.5 million, is centrally situated within the city of Seattle on a water-based site; it is accessible both by barge (for bulk fuel off-loading) and truck and trailer (for transport to bases). Exhibit G-1 below illustrates the tank farm's location in relation to the Seattle region and Metro's bus bases.

Metro expects to have the new fuel reserve fully operational by late Spring 1983. The storage tanks are now being rehabilitated and retrofitted; also, the off-loading pier is undergoing substantial reconstruction. Once on line and filled to capacity, the reserve will provide Metro with a guaranteed 90-day emergency supply of diesel fuel.

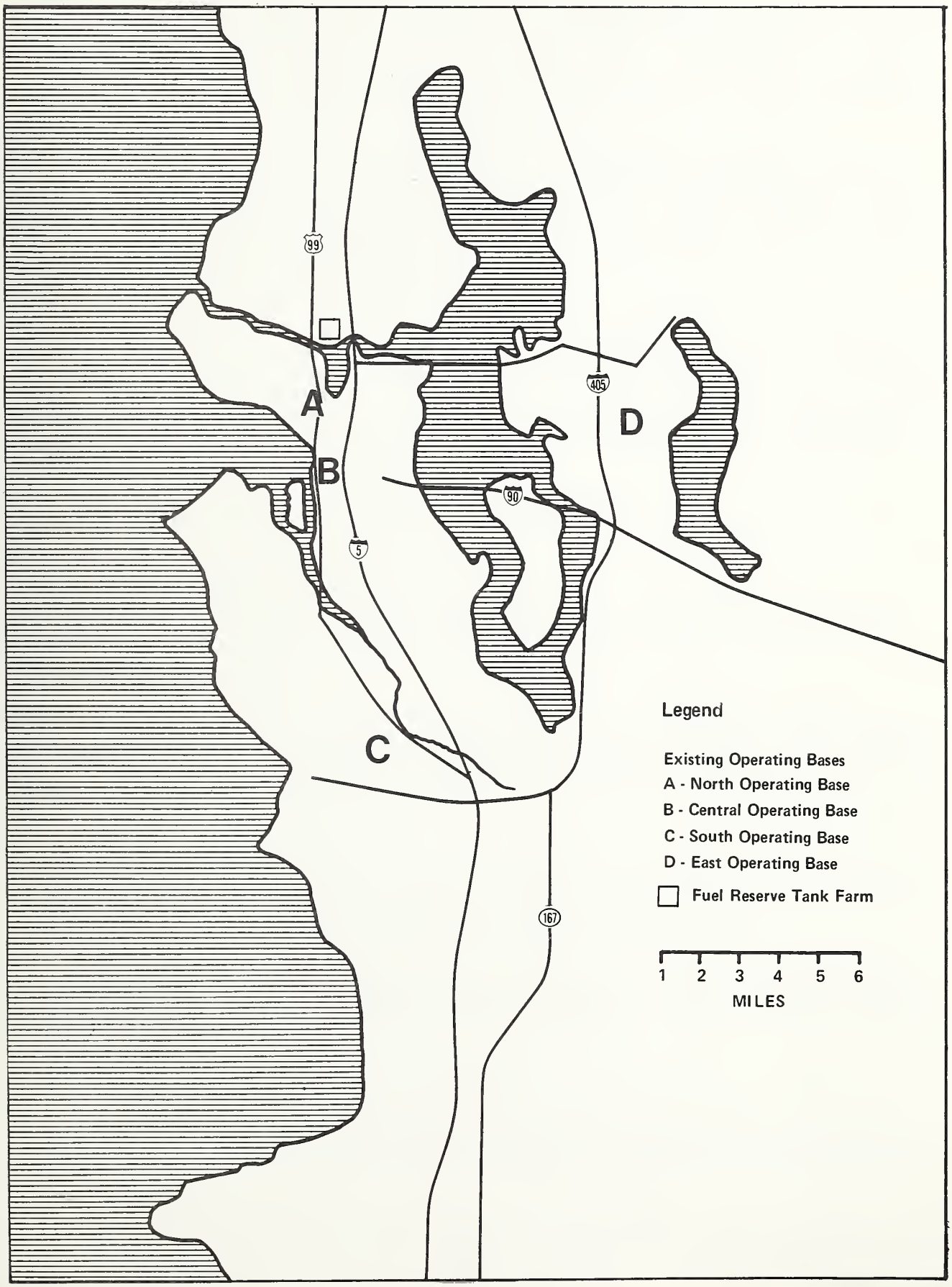
The following section summarizes Seattle Metro's experience in fuel reserve planning. First, it examines the agency's response to the 1973-74 and 1979 energy crises. Second, it describes the process by which Metro developed a range of fuel reserve lease, purchase and new construction alternatives. In particular, the rationale for choosing to buy an existing tank farm (rather than pursue other fuel reserve options) is analyzed. Third, lessons from the Metro experience of potential utility to other transit systems are highlighted.

The 1973-74 Oil Embargo

Like most transit properties, Metro's initial confrontation with the threat of a fuel shortage occurred late in the fall of 1973 following the Middle East oil embargo. On November 1, 1973, Metro received notification that its supplier, the Atlantic Richfield Company (ARCO), would be terminating all diesel fuel deliveries--effective immediately. At the time the system's monthly operational demand for fuel was 288,000 gallons per month.

Metro responded to this sudden supply cut-off by seeking to secure alternative emergency fuel supplies in accordance with the Federal Mandatory Allocation Plan (FMAP). Under

Exhibit G-1 The Metro Fuel Reserve Tank Farm in Relation to Operating Bases (adapted from John Graham and Co., 1981)



the FMAP scheme, Texaco (Metro's supplier of record in 1972), was assigned the responsibility for delivering fuel to the transit system, but only at 1972 levels. In reality, these supplies were still some 33 percent below 1973 operational needs due to service-related jumps in consumption. Also, considerable uncertainty existed as to the security of "guaranteed" deliveries beyond the end of November 1973. Unfortunately, the FMAP contained no provisions whatsoever to address the priorities by which emergency suppliers like Texaco should allocate fuel to its customers. Metro fuel stocks were, meanwhile, running low and the prospect of service cutbacks loomed close by.

Around mid-November, Metro's bleak fuel supply status improved somewhat. Thanks to the advisory notice published by the Federal Office of Petroleum Allocation, transit properties were assigned a high priority fuel allocation ranking. What this meant was that for a period of 60 days (i.e., through January 15, 1974) Metro could count on receiving adequate operational fuel supplies from Texaco. Beyond this time frame, however, the future of guaranteed supplies remained uncertain.

By late winter 1974, once the domestic fuel supply market had begun to readjust itself, Metro gradually found it easier to purchase its operational fuel requirements from local independent dealers. The system had, in fact, managed to weather the world's first major energy crunch in fairly good shape. Service levels, for example, never had to be reduced at any point for lack of fuel. The shock also stimulated strategic thinking within the agency on how to conserve fuels and what steps could be taken for ensuring emergency fuel supplies in the future. These steps included:

- The development of a service reduction contingency plan.
- The determination of immediate actions to be taken to reduce overall fuel consumption.
- The delineation of actions to be taken to help ensure adequate fuel supplies.

The 1979 Iranian Oil Crisis

Following the 1973-74 fuel crisis, Metro experienced sizeable price increases but no actual supply problems for nearly the next five years. Then, in mid-May of 1979, Metro learned that its fuel supplier might not be able to make deliveries for the last week of the month. At the time system-wide operation demand stood at approximately 630,000 gallons per month.

This development immediately prodded the agency to seek additional fuel supplies from other sources and to improve its emergency reserves situation. In late May 1979, Metro bought 250,000 gallons of diesel on the "spot market" and placed it in a privately-owned storage facility. As of October 1982, the reserve is still being matinained.

Almost simultaneously, Metro's governing council decided to initiate a feasibility study on the need for and costs of a permanent transit fuel reserve. This step marked Metro's formal entry into the search for additional fuel storage capacity that could be leased, purchased or newly constructed.

Metro Fuel Reserve Planning Activities--1979-82

The 1979 Iranian crisis provided the greatest impetus to Metro's deliberate planning for a permanent fuel reserve. Staff began by researching the availability of used tanks for sale,

including government surplus equipment. Information was also gathered on the comparative costs of various diesel storage options--above and below-ground; centralized and decentralized. The preliminary groundwork continued well into the fall of 1979; however, no definite fuel reserve proposals were ever formally set forth. Also, as the market for fuel improved, some of the urgency underlying the establishment of a permanent Metro reserve subsided and other energy management activities took precedence.

Late in 1980, the opportunity presented itself to negotiate a long-term contract with a major independent supplier, The Atlantic Richfield Oil Company (ARCO), thereby freeing Metro from much of the insecurity it had felt under previous short-term supply mechanisms. Although the concept of a permanent fuel reserve was not shelved entirely, it was temporarily placed on the back burner. Metro continued to lease fuel reserve storage (250,000 gallons worth) in Tacoma. In addition, another special reserve agreement (resembling a fuel supply insurance policy was instituted in 1982. For $400.00 per month, a local Seattle dealer guaranteed delivery of one million gallons of diesel fuel should ARCO, Metro's primary supplier, be unable to deliver fuels according to contract. Together these arrangements gave the agency considerable emergency supply security.

Shortly after signing the ARCO contract in 1980, Metro again seriously began to explore permanent fuel reserve alternatives. The case for the reserve was premised on the grounds of enhanced security of supply; Metro also prepared a series of cost-effectiveness analyses on the hypothetical long-term fuel purchase savings that the system might enjoy if various reserve strategies were implemented. It was assumed that fuel prices would continue to rise in the future. Consequently, a permanent reserve appeared to lower the risk of an acute fuel shortage and broadened the agency's access to significant economies of scale in the area of fuel purchasing.

Up until the spring of 1981 no preferred reserve option had yet emerged. At that time, staff elsewhere within Metro identified the Chevron tank farm while looking for a water quality facility site. These tanks lay along the shore of Lake Union, just north of downtown Seattle. Once referred to the Metro Executive Director and Energy Advisor, this site was quickly endorsed as a viable transit fuel reserve candidate.

The Fuel Reserve Study

The transit fuel reserve study completed in late 1981 under a consultant contract, evaluated four generic types of alternatives: centralized new construction; decentralized new construction; existing facility lease; and existing facility purchase. Preliminary planning criteria, reflecting tank facility size, location and design preferences, were set forth (see Table 1). From a hypothetical list of available sites located throughout the Seattle Metropolitan area, approximately 10 reasonable fuel reserve candidates were identified. Four of the sites consisted of existing Metro operating bases; the balance represented three existing storage facilities available for lease or purchase and three locations where new construction might be feasible (Exhibit G-2).

The consultant's analysis focused almost exclusively on site development issues related to comparative facility costs and environmental/development permitting requirements. To a lesser degree, technical and socio-political considerations were also addressed. The study represented only a preliminary evaluation of the advantages and disadvantages of specific alternatives. No one fuel reserve option was ever recommended. Among the existing facility-lease purchase alternatives, however, the Chevron tank farm emerged as a clear favorite.

Exhibit G-2 Existing Metro Operating Bases and Sites Identified for Several Fuel Storage Alternatives

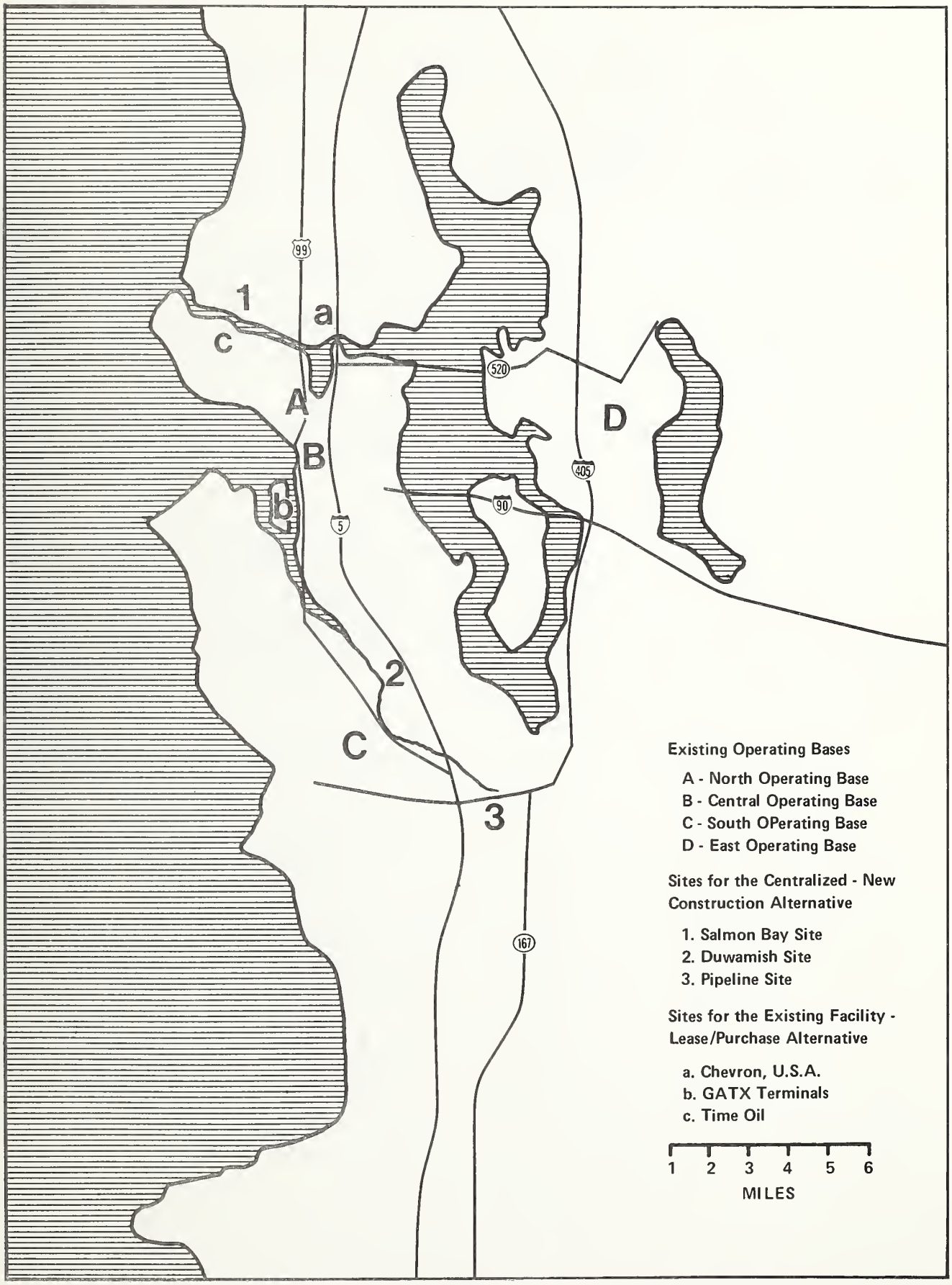


TABLE 1

METRO FUEL RESERVE SITING CRITERIA

	Alternatives			
	Central-ized	Decentral-ized	Lease	Purchase
A. General Criteria				
These criteria apply to all four of the fuel reserve alternatives:				
1. The fuel storage capacity should be 1.3 million gallons.	X	X	X	X
2. The site should be located such that it minimizes travel time to the operating bases and it has convenient tank truck access.	X	X	X	X
3. To ensure development feasibility and community acceptance, the proposed use of the site should be consistent with the existing local comprehensive land use plan designation, zoning and shoreline master program requirements (if applicable) and any proposed revisions.	X	X	X	X
4. The proposed fuel reserve should be compatible with existing adjacent and surrounding land use.	X	X	X	X
5. The site should not possess any known geologic hazards or be located in an environmentally sensitive area.	X	X	X	X
6. The site should have available the following utilities at the required levels of service: electrical power, water (potable and fire flow), storm drainage, and sanitary sewers.	X	X	X	X
7. The site must be able to be secured by standard fencing and berming.	X	X	X	X

(Cont.)

TABLE 1 (Cont.)

	Alternatives			
	Central-ized	Decentral-ized	Lease	Purchase
B. Specific Criteria				
These criteria apply to specific fuel reserve siting alternatives.				
1. Preferably the site of the fuel reserve should be centrally located to the operating bases (within a 10- to 20-mile radius of Seattle's Central Business District) in order to minimize travel time to the operating bases.	X		X	X
2. Preferred sites are adjacent to existing operating bases to increase the efficiency of fuel supply associated with each operating base.		X		
3. If sites adjacent to operating bases are not available, a site should be located centrally to two or three operating bases and be equally accessible to all.		X		
4. The site should have a minimum size of two acres in order to accommodate tankage for 1.3 million gallons of storage, oil spill containment berms, piping for on-site fuel distribution, loading, office/shop and employee parking.	X		X	X
5. Fuel storage should be above ground.	X		X	X
6. Preferably the site is undeveloped or under-utilized in order to minimize site acquisition and development costs.	X	X		
7. The site should be readily available for purchase.	X	X		X
8. The site should have water access which can accommodate fuel barge deliveries in order to take advantage of bulk fuel purchasing.	X		X	X

TABLE 1 (Cont.)

	Alternatives			
	Central-ized	Decentral-ized	Lease	Purchase
9. The topography of the site should slope no more than 5 percent to minimize tank facility siting costs.	X	X		
10. The site should be available within six months of the completion of this study and have a lease term of at least two years with a renewable option for an additional two years.			X	
11. Leasing terms should be significantly more advantageous than terms of a sale for comparable site and development costs.			X	

The Analysis of Alternatives

The detailed analysis of fuel reserve alternatives reflected Metro's bias in support of buying the tank farm. Generally speaking, no other purchase option was ever seriously considered. New construction was rated too costly, too time consuming from a development permitting standpoint, and highly susceptible to political and community controversy.

Expanded leasing (Metro had been leasing reserve storage since 1979) failed to be chosen for a number of reasons. First, it would not provide Metro with comprehensive fuels access and management control. Second, to rent storage meant that cash outlays would have to be made without the benefit of receiving any investment equity in return. Consequently, leasing seemed less than cost-effective in comparison to ownership and precluded the option of relinquishing title to the facility in the future should Metro choose to do so. Third, leasing failed to overcome long-term uncertainty about the security of supply. Other risks also persisted. For example, the system might incur uncontrollable increases in operating expenses or be subjected to a sudden lease termination.

Metro's preferred alternative of buying the tank farm inspired considerable political and economic debate over the projects projected costs and benefits compared to various lease options. Internally, Metro calculations concluded that a better economic return on investment would accompany ownership. Certain parties outside the agency, however, offered different analyses, based on different basic assumptions, that favored leasing. Developing a consensus on which option to pursue became a difficult and time-consuming process and one that was highly politically charged.

In addition, noting that the near-term oil supply outlook projected nothing but a surplus with little or no evidence of steep price hikes or delivery problems, some lease proponents felt the tank farm purchase to be a premature capital expenditure. When finally voted upon in April 1982, however, the Metro Council almost unamimously authorized purchase of the Chevron facility. The sales price ultimately negotiated came to $2.5 million and in July 1982, title confirming Metro ownership was officially transferred.

From the original identification of the Chevron site to its date of purchase, approximately one year of Metro planning, evaluation and negotiation activities elapsed.

Projected Renovation, Retrofit and Operational Costs

Approximately $370,000 worth of tank farm renovation and retrofit is envisioned by Metro. About $270,000 will be spent on a two-part project to rehabilitate the petroleum handling facility. Another $137,000 has been earmarked for reconstructing the tank farms off-loading pier. Most of this work is scheduled to be completed by spring 1983; the tank farm should be fully operational in early July of the same year.

Assuming that the tank farm retrofit proceeds according to plan, diesel fuel will be purchased on the spot market and placed in storage some time in March 1983. An initial budget of $830,000 exists for this purpose. Subsequent fuel purchase arrangements have yet to be scheduled.

At the present time, operating costs--excluding the expense of facility management labor and fuel transportation out to bases--are expected to run $50,000 per year. This total should cover cash outlays for utilities, supplies, routine maintenance and miscellaneous services.

Development Permitting

To date no delays in attaining the necessary permits and authorizations required for activating the tank farm reserve have been experienced. Because Metro's proposed use of the facility will not differ too significantly from current uses, only a few new regulations apply, e.g., air pollution permits; petroleum off-loading and transportation permits. A negative declaration of environmental impact was prepared, thus obviating the need for a time consuming assessment. In most instances, permits and approvals were routinely acquired.

Lessons from the Seattle Metro Experience

It would be wrong to characterize the Seattle Metro experience as being "typical" of how all transit systems ultimately should conduct planning for fuel reserves. The process by which needs and priorities evolved, alternatives were developed, and a preferred option was chosen, did not follow an orderly decision-making sequence.

The Metro experience did demonstrate, however, that--even during an oil supply "glut"--a public sector commitment to long-term planning for emergency fuel supplies can be developed. This commitment not only consisted of official policy-level support behind the concept of a permanent reserve, but also a considerable investment of time and effort by key staff. Unless this type of agency-wide support is achieved, the odds are that transit reserves may simply be written off as being unnecessary, too risky a venture, or overly expensive.

It is preferable that a wide range of possible reserve strategies be developed during the initial planning phase--leasing, purchasing and new construction, etc. Every system should, however, focus detailed studies only on those options that appear most affordable, functional and consistent with preliminary siting criteria.

Staff essentially viewed the tank farm as a long-term solution to the property's security of supply concerns. The site appeared unexpectedly, clearly matched transit reserve needs, and was affordable. Also, the proposal's timing was right. Executive staff and Council support came forth promptly and sufficient monies were readily available to underwrite capital investment and renovation costs. Although opponents of the acquisition proposal at times gained sufficient political momentum to threaten the plan, they ultimately failed to convince the Metro Council.

Other transit systems should remember that, regardless of their fuel storage requirements, reserve strategies can be tailor-made to suit technical and financial capabilities. While all managers require the security of knowing that an adequate emergency supply exists nearby at all times, for example, they need not feel obliged to purchase or build a major off-base facility. Leasing, despite certain financial and operational disadvantages, may be the most affordable option--particularly over the short term. Fairly reliable arrangements can usually be negotiated with private companies on fairly short notice.

Purchasing a fuel reserve on the same scale as Metro may well be beyond the capacity of most average-sized transit systems. Wherever an option to buy may resolve emergency fuel supply insecurity or suits other agency needs, however, it should be evaluated equally alongside a variety of alternatives. The Seattle Metro decision hinged on a commitment to increase security of supply and the expectation that fuel cost savings might be achieved in the future.

APPENDIX H

EMERGENCY FUEL SUPPLY GUIDELINES FOR THE UNPREPARED TRANSIT MANAGER

Introduction

Transit managers who have conducted strategic planning for fuel reserve storage will probably be able to cope with a wide variety of supply emergencies. Over the short term, at least, reserves either on hand or within reach should sustain systems during the immediate crisis and allow management enough time to identify alternative supply arrangements. Regular bus services need not be disrupted in most cases.

Some properties, however, may be caught off guard or else overwhelmed by a fuel shortage emergency. Without anywhere to turn for set-aside supplies, operators might have to institute severe operational cuts or consider a temporary system-wide service shutdown. Also, the lack of sufficient reserves could restrict the expansion of services. Either way, both the system and the public suffer.

Transit managers must be prepared to identify emergency fuel supplies for meeting operational demands even under the worst of conditions. Standard procedures are required to guide decision making in the event that fuels suddenly become scarce, deliveries falter, or some unexpected disaster occurs.

Summary of Recommended Procedures

There are a number of steps operators can initiate on short notice when confronted by a fuel emergency:

Step 1. Determine type of emergency and quickly inventory how much fuel is currently on hand or otherwise committed and available.

Step 2. Set some realistic short-term goals for transit service levels during the emergency period.

Step 3. Determine how much additional fuel is required to meet these goals.

Step 4. Survey suppliers and contract for fuel deliveries.

Step 5. As a last resort, prepare to institute service cutbacks.

STEP 1. DETERMINE TYPE OF EMERGENCY AND QUICKLY INVENTORY HOW MUCH FUEL IS CURRENTLY ON HAND OR OTHERWISE COMMITTED AND AVAILABLE.

Pinpoint the Nature of the Emergency

First, establish what kind of emergency exists (energy crisis, flood, earthquake, etc.), how it is likely to affect the property, and how long it might last. Determine the degree to which current service levels might be adversely affected. Be specific about the

proportion of the transit system involved. Wherever appropriate, map out the geographic scale and likely impacts of the emergency on particular service routes and ridership.

Determine How Much Fuel Is Currently on Hand or Within Reach

Inventory how much fuel is available and accessible from storage tanks owned or leased by the transit property, including:

- On-base storage at fleet maintenance bases.
- Off-base storage facilities.

Estimate the Number of Days of Regular Operational Demand That Could Be Met by Existing Supplies

Draw up a few preliminary service level alternatives. Besides thinking about consolidating supplies at key bases, explore options for extending the life of these supplies by means of route rescheduling or elimination. If, for example, service must be expanded during the emergency, then determine the operational availability of a reserve bus fleet as well as other types of transit vehicles, e.g., school buses and vans. Survey the logistics of fueling various combinations of vehicles for the probable duration of the crisis.

Activate All Other Emergency Fuel Supply Mechanisms

Operators must also tap into fuel supplies committed to the property under contractual or, if available, government-sponsored emergency allocation agreements. Whenever these reserves do exist, suppliers should be instructed to ready fuels for delivery to the transit system as they are needed, given on-base tank storage capacities.

STEP 2. SET SOME SHORT-TERM OPERATIONAL GOALS FOR THE EMERGENCY PERIOD.

Determine Operational Goals

Once the operator understands the nature of the crisis, the possible range of service impacts and the extent of available fuel supplies, practical system-wide operational goals should be set. If supplies on hand easily exceed a system's short-term needs, for example, drastically altered transit service patterns may not be necessary.

On the other hand, the shock of an emergency, combined with a transit property's inability to draw from an adequate reserve supply, may force a manager to consider service cutbacks. The identification of short-term goals will help mobilize the system's strengths regardless of the crisis situation. It will also facilitate emergency planning performance evaluations once the crisis has passed.

Be Realistic About Service Level Planning

Above all it is important to be pragmatic. Operators require a simple, realistic strategy for meeting the crisis head-on while not overextending the system's capacity to provide service effectively. A reasonably accurate estimate of fuel supplies on-hand or within reach should guide decision making in this area. Avoid committing the property to emergency services which clearly cannot be provided.

STEP 3. DETERMINE HOW MUCH ADDITIONAL FUEL IS REQUIRED TO MEET THESE GOALS.

Identify Fuel Needs Over and Above Supplies On-Hand or Within Reach

Especially severe emergencies aggravated by inadequate fuel reserves will force many transit operators to seek diesel and gasoline fuels from alternative suppliers. This point is reached when protected emergency fuel needs exceed supplies on hand or otherwise committed.

It will not take transit managers long to pinpoint fuel supply deficiencies given emergency service goals. In general, at least a 30-day operational fuel supply should be secured to survive the immediate crisis. As soon as operators see they cannot attain this minimum volume from stored and/or committed reserve sources, supply deficits can be calculated and the search for other fuel supplies can begin.

STEP 4. SURVEY SUPPLIERS AND CONTRACT FOR FUEL DELIVERIES.

Conduct a Quick Telephone Survey of Fuel Suppliers

This task involves a fairly straightforward procedure of contacting potential fuel suppliers by telephone, within a 100-200 mile radius of the transit system. Many properties may already have a list of possible suppliers. Besides referring to industry directories, state, local and federal energy agencies can be contacted for assistance.

Contract for Fuel Deliveries

The kinds of suppliers most likely to be equipped to aid transit systems include:

- Independent wholesale/retail suppliers.
- State sponsored fuel set-aside programs.
- Airport and seaport operations.
- Refinery installations.
- Military installations.
- Large industrial complexes.

Depending on the amount of fuel required and the existence of willing suppliers, bulk purchase contracts should then be negotiated by the transit manager. At all times, remember that immediate delivery may be more important than purchase price during a crisis. Consequently a minimum of effort should be devoted to securing the best possible (i.e., cheapest) financial deal.

Provide for Fuel Transportation to Base

Operators must ensure that receipt of these supplies occurs in a timely manner, given emergency operational requirements. If transport is not included in a fuel purchase contract, the property will have to make its own arrangements for moving gasoline and

diesel fuels from suppliers to transit storage tanks via barge, pipeline, truck and trailer or some combination of each mode.

Maintain an Updated Emergency Supplier File

Finally, once an operator has developed a network of potential emergency fuel supply sources (names, addresses and phone numbers), it should be kept up-to-date for future reference.

STEP 5. AS A LAST RESORT, PREPARE TO INSTITUTE TRANSIT SERVICE CUTBACKS.

Finalize a Service Reduction Contingency Plan

Assuming that sufficient emergency fuel supplies cannot be identified quickly enough, the system may be forced to temporarily curtail all or part of its operations. Transit managers should prepare for this contingency at the first sign of a fuel shortage. Even if cutbacks are never actually required, having a strategic plan outlining procedures will help operators respond intelligently to crisis situations--regardless of their severity and duration.

The service reduction contingency plan should address a series of alternative actions aimed at using available fuel supplies as efficiently as possible over the projected course of an emergency. To begin, both long and short-haul routes with marginal ridership levels could be eliminated, or else off-peak service substantially reduced throughout the system.

Besides making service schedule revisions that reflect the nature of the crisis, a contingency plan should work to reassign the most fuel efficient equipment (buses, vans, paratransit vehicles and non-revenue vehicles) to the transit system. Consider, for example, which fleet storage and maintenance base(s) would best minimize empty "deadhead" runs to and from emergency service routes. One further strategy might be to focus on operations out of one or two bases and to divert all available fuel supplies to those bases. Also, diesel and gasoline supplies previously earmarked for non-essential transit should be reallocated to fuel the system's emergency transit fleet.

Throughout the course of this exercise, transit managers should think in terms of at least three crisis scenarios: severe-long term; moderate-short term; mild-short term, etc. Hopefully, this perspective will enable them to design a service reduction alternative best suited to the emergency and one which makes use of scarce fuel supplies most effectively.

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